

furthermore from *G. spinicauda* in the absence of the anterior antennal carina, the absence of the anterior row of tubercles on the first abdominal somite, and in the low and blunt tubercles of carapace and abdomen; from *G. longleyi*, it differs in that the posterior lateral carina is straight, and in that the abdomen shows no median carina on the second and third somites; finally, it differs from *G. haematonotus* in the blunt tubercles on carapace and abdomen.

Glyphocrangon longleyi Schmitt

Figs. 6, 7

Glyphocrangon longleyi Schmitt, 1931, Yb. Carnegie Instn, Wash., 30: 393.

—Bullis, 1956, Comm. Fish. Rev., 18(12): 10.

Glyphocrangon (Glyphocrangon) longleyi Springer & Bullis, 1956, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 196: 13.—Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8 (p.p.).

Glyphocrangon spinicauda "Form B" Dobkin, 1965, Bull. Mar. Sci. 15: 874, 881, fig. 1c.

Glyphocrangon (Glyphocrangon) spinicauda Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8 (p.p.).

Material Examined.—Off east coast of Florida, U. S. A.: PILLSBURY sta. 89, 1 ovigerous female; COMBAT sta. 84, 1 ovigerous female (USNM); sta. 120, 1 ovigerous female (USNM); sta. 186, 1 male, 2 ovigerous females; sta. 193, 6 females (5 ovigerous) (USNM); sta. 329, 1 ovigerous female (USNM); PELICAN sta. 13, 1 ovigerous female (USNM); sta. 20, 2 ovigerous females; sta. 27, 1 ovigerous female; sta. 31, 2 females (USNM); sta. 46, 1 ovigerous female (USNM); sta. 54, 2 ovigerous females (USNM).—Straits of Florida, U. S. A.: GERDA sta. 15, 1 female; sta. 62, 4 males, 1 female; sta. 66, 2 females; sta. 67, 1 male, 9 females (4 ovigerous); sta. 76, 1 male, 2 females (1 ovigerous); sta. 77, 1 male, 3 females (1 ovigerous); sta. 164, 1 male; sta. 171, 1 female; sta. 197, 1 female; sta. 228, 1 female; sta. 230, 9 specimens; sta. 288, 130 specimens (42 ovigerous); sta. 289, 20 specimens (8 ovigerous); sta. 362, 1 juvenile; sta. 439, 2 females (1 ovigerous); sta. 440, 10 specimens (1 ovigerous); sta. 465, 16 specimens (13 ovigerous); sta. 467, 6 specimens (4 ovigerous); sta. 469, 4 ovigerous females; sta. 472, 4 specimens; sta. 474, 2 specimens; sta. 475, 1 ovigerous female; sta. 483, 18 specimens; sta. 766, 17 specimens (15 ovigerous); sta. 834, 3 females (2 ovigerous); sta. 845, 2 females (1 ovigerous); sta. 861, 5 specimens (1 ovigerous); sta. 967, 6 males, 15 females (2 ovigerous); sta. 968, 7 females (5 ovigerous); sta. 969, 1 specimen; sta. 970, 29 specimens; sta. 1018, 1 juvenile; sta. 1098, 11 specimens; OREGON sta. 1351, 2 ovigerous females (USNM); sta. 1354, 2 males; PELICAN sta. 17, 1 ovigerous female (USNM); sta. 18, 20 females (13 ovigerous) (USNM); Pourtales Plateau, 1956, G. L. Voss, 1 ovigerous female (USNM).—North-

west Providence Channel, Bahama Islands: GERDA sta. 190, 5 specimens; sta. 679, 2 specimens; sta. 917, 2 specimens.—N of Cuba: OREGON sta. 1324, 7 females (6 ovigerous) (USNM).—Off Dry Tortugas, Florida, U. S. A.: 180-220 fms, R/V ANTON DOHRN, trawled, 31 July 1930, W. L. Schmitt, 1 ovigerous female holotype (USNM, Cat. No. 65948), 5 specimens (3 ovigerous) (USNM); 253-293 fm, 8 July 1931, W. L. Schmitt #22-31, 1 juvenile (USNM); 20 miles S of No. 2 Red Buoy, 290 fm, boat dredge, R/V ANTON DOHRN sta. 19, 3 July 1931, W. L. Schmitt, 1 male, 1 ovigerous female (USNM); 20 miles S of No. 2 Red Buoy, 295-315 fm, 19 July 1932, W. L. Schmitt #54, 2 specimens (USNM); Dohan dredge, 5-7 June 1939, A. A. Boyden, 4 specimens (2 ovigerous) (USNM); 200 fm, R/V ANTON DOHRN, W. C. Schroeder, rec'd August 1940, 1 ovigerous female (MCZ); OREGON sta. 1015, 6 specimens (USNM); sta. 1334, 1 specimen (USNM); sta. 1539, 1 specimen (USNM); COMBAT sta. 281, 1 ovigerous female.—Eastern Gulf of Mexico: OREGON sta. 489, 2 males, 12 females (3 ovigerous) (USNM).—Off Louisiana, U. S. A.: OREGON sta. 1407, 12 females (5 ovigerous) (USNM).—Western Gulf of Mexico: OREGON sta. 532, 2 ovigerous females (USNM); sta. 542, 1 ovigerous female (USNM); sta. 549, 1 specimen (USNM).—Off Yucatan, Mexico: PILLSBURY sta. 585, 1 juvenile; sta. 600, 2 juveniles; sta. 602, 6 specimens (2 ovigerous).—Off Atlantic coast of Nicaragua: OREGON sta. 1906, 7 specimens (USNM); sta. 1908, 2 specimens (USNM); sta. 1915, 1 specimen (USNM); sta. 1916, 2 specimens (USNM); sta. 1919, 1 ovigerous female (USNM); sta. 1923, 1 specimen (USNM); sta. 1929, 3 ovigerous females (USNM); sta. 1931, 1 specimen (USNM); sta. 1933, 18 specimens (1 ovigerous) (USNM).—Off Atlantic coast of Colombia: PILLSBURY sta. 374, 144 specimens (54 ovigerous); sta. 381, 28 specimens.—NW of Anguilla: PILLSBURY sta. 989, 1 male, 4 females (2 ovigerous).—Off Guadeloupe: PILLSBURY sta. 923, 2 males, 5 females (2 ovigerous).—Off Santa Lucia: PILLSBURY sta. 904, 4 specimens.

Description.—The body is covered between the carinae and tubercles with a dense, short pubescence. The rostrum is wide and rather flat, compared to those of *Glyphocrangon spinicauda* and *G. haematonotus*. The distance between the teeth of the anterior pair is 0.7 to 0.8 times the distance between the two pairs of rostral teeth (0.7 in juveniles, 0.8 in the largest specimens). Between the anterior teeth the rostrum is flat, hardly at all hollowed, and the teeth are directed obliquely upward and forward. There is no noticeable fringe of long hairs across the base of the rostrum. In adult specimens, the tip of the rostrum is somewhat longer than the basal part (i.e., the part proximal to the anterior lateral rostral teeth) and shorter than the distance between the anterior and cervical grooves measured in the median line. In very young specimens, the tip is 1.5 times as long as the distance between the grooves.

The six tubercles of the anterior submedian carinae of the carapace are very wide and blunt, and show a reticulate pattern of ridges. To the inside of these carinae there are up to ten very small smooth tubercles, which are largely obscured by the pubescence. To the outside of the carinae there are about two to five tubercles, which often are fused with the tubercles of the carina itself. The posterior submedian carinae have three or four tubercles similar to those of the anterior carinae, to the outside of which there may be some smaller, inconspicuous tubercles. The anterior intermediate carina is indistinct and consists of an irregular row of some four blunt and low tubercles; the anterior of these does not form a spine. The posterior intermediate carina is formed of four or five irregular, blunt and broad tubercles, with a row of two to six small, inconspicuous tubercles along its inner side. There is no anterior antennal carina. The posterior antennal carina ends in a distinct anterior tooth, which in very large specimens may be reduced to a rectangle. The carina itself is not straight, but is uneven in outline, as if with remnants of tubercles. The anterior lateral carina ends slightly above, almost in, the branchiostegal spine. It bears two distinct, winglike, expanded teeth, the anterior of which is distinctly larger than the posterior and reaches slightly beyond the posterior orbital margin; these teeth lie in one line; they are wider, and also reach farther sideways, than in either *G. spinicauda* or *G. haematonotus*. The posterior lateral carina ends anteriorly in a small sharp tooth or rectangle; it is uneven, as if with the remnants of two or three tubercles. The anterior sub-lateral carina is distinct; the posterior is irregular and may have a spiniform process. The anterior submarginal carina is distinct; it is widely separated from the posterior, which is reduced to a very short ridge at the posterolateral angle of the carapace, where it is fused with the marginal carina. Beyond the posterolateral angle, the carina is continued along the inside of the posteromarginal groove, as a row of some four tubercles. The posteromarginal and lateral grooves are not continuous with one another, but interrupted at the posterolateral angle of the carapace by the fusion of the posterior submarginal and marginal carinae. The antennal spine is directed obliquely upward and is curved somewhat inward, but does not noticeably extend sideward, so that in dorsal view the antennal spines do not reach sideways beyond the branchiostegal. The branchiostegal spines are longer and higher than the antennal. Two very inconspicuous ridges extend inward from the branchiostegal spine; one reaches the anterior lateral carina a short distance behind its anterior end, the other lies slightly more ventrally.

The ridges on the abdomen consist of low, wide, and very blunt tubercles, although their arrangement is much like that in *G. haematonotus*. The spines on the pleura usually are longer in the present species than in *G. haematonotus*, but the difference is not always very clear, especially not

in the juveniles. The dorsal submedian ridges of the fifth abdominal somite reach far less close to the posterior margin than in *G. haematonotus*. The sixth abdominal somite resembles that of *G. spinicauda*, in that the dorso-median carina is deeply incised in its basal part, and in that the two central lateral ridges are broken up, each consisting of two short ridges or tubercles; these four ridges lie approximately in one line. Also, the lower ridge is divided into shorter ridges. A tubercle is placed some distance above the posterior part of the upper median carina, and one is placed between the posterior parts of the median and lower carinae.

The eyes are somewhat larger than those of *G. haematonotus*, but otherwise are very similar.

The scaphocerite is broader and more oval than in *G. haematonotus*. Juveniles always have a distinct tooth in the lower part of the external margin, but in adults it is usually missing.

The right second leg is more slender than the left; its carpus has about 30 against 20 articles. The dactyli of the last three pereopods are oval, and simply pointed. That of the third is shorter ($\frac{1}{3}$ of the length of the propodus) and somewhat higher than those of the fourth and fifth legs. All have a distal groove dorsally, carrying some hairs.

The thoracic sternum shows no spines, in either males or females.

The uropods are more slender than in *G. haematonotus*.

Size.—The carapace length of the examined specimens varies between 13 and 56 mm. The largest male measured has a carapace length of 45 mm. Ovigerous females with carapace lengths between 43 and 56 mm were found. The holotype, an ovigerous female, has cl. 52 mm. The eggs have a diameter of 2 to 3.5 mm.

Colour.—The rostrum is pale orange, pink, or whitish. The tip is darker orange red in most specimens, but in some it is hardly at all darker than the rest of the rostrum. The basal, and sometimes also the distal, lateral rostral teeth are red, while also the basal part of the rostrum is a darker reddish colour than the distal part—this is especially true of the lateral margins. The anterior submedian and intermediate carinae of the carapace are dark orange red. The posterior submedian and intermediate ridges are white. The contrast in colour between the orange red anterior and white posterior submedian carinae is most striking and forms a constant character, which greatly helps in identifying the species in the field. The orange red colour of the intermediate ridges is less constant; sometimes it covers only the anterior part of the anterior ridge, leaving a small posterior part white, and sometimes it extends onto the extreme anterior part of the posterior ridge. The other carinae of the carapace are uncoloured. The antennal and branchiostegal spines are dark orange red, and sometimes also the tip of the anterior tooth of the anterior lateral carina has that colour.

The abdomen is pale orange or whitish. All the tubercles and carinae of the dorsal part of the tergum are orange red; those on the pleura and the extreme lateral part of the tergum are uncoloured. In some specimens, the tips of the pleura of the fifth and sixth somites are orange red. The tail fan is pale or somewhat darker orange red, becoming darker posteriorly. The carinae on the telson are orange red.

The antennula is pink or whitish, with the larger part of the first segment red. Of the antenna, the basal segments and the outer proximal part of the scaphocerite are red, the rest is pink, pale orange, or whitish.

The mouthparts, including the third maxilliped, are dark orange red. The first pereopods are of the same colour, but may be paler in their basal parts. The second pereopod is uncoloured, or has the chela and the extreme distal part of the carpus very pale orange. The last three pereopods are also uncoloured, except for the dactylus and the distal part of the propodus, which are pale orange.

The pleopods are uncoloured. In an abnormal ovigerous female the stylamblys was coloured orange in the fifth somite.

The eggs are pale greenish or bluish green.

In the young, the body is white with three red areas: (1) an anterior dorsal spot covering the base of the rostrum and the anterior submedian carinae, (2) an anterior lateroventral spot covering the antennal and branchiostegal spines, the base of the antennulae and antennae, and the mouthparts, and (3) a posterior dorsal spot covering the first five abdominal somites (including the pleura). This colour pattern actually is a simplified version of that of the adults. Here, also, the sharp contrast between the anterior and posterior submedian carinae of the carapace is most striking.

Parasites and Commensals.—Several specimens carried Lepadidae on the body; they were found on the rostrum, scaphocerite, the eyestalk, the third maxilliped, the pereopods, the abdominal pleura, the pleopods, and the uropods. In four instances an unknown organism, possibly a parasite, was found on the rostrum and the anterior part of the carapace of ovigerous females (from GERDA stas. 67 and 288, and PILLSBURY stas. 374 and 923). These organisms are vermiform and as if glued to the carapace and rostrum, where they may form distinct coiled masses. The nature of these organisms has not yet been ascertained. A similar, but smaller, organism was found on the ventral surface of the abdomen of a specimen of *G. longirostris* (see p. 339).

Horizontal Distribution.—The species is known from the east coast of Florida, the Bahamas, and the entire Gulf of Mexico south to Santa Lucia (W.I.), Yucatan and Colombia. The records in the literature are: Off the east coast of Florida: 29°57'N, 80°10'W (200-205 fm), 29°56'N, 80°10'W (190 fm), 29°47'N, 80°11'W (155-172 fm), 29°47'N, 80°12'W (185-190

fm), 29°44'N, 80°13'W (180 fm), 29°44'N, 80°09'W (220 fm), 29°15'N, 80°05'W (210 fm) (Bullis & Thompson, 1965). Straits of Florida: 26°31'N, 79°46'W (235 fm), 26°18'N, 79°51'W (144-200 fm), 25°16'N, 80°00'W (185 fm), 25°11'N, 79°55'W (300 fm), 24°05'N, 79°46'W (350 fm) (Bullis & Thompson, 1965); 25°30'N, 79°58'W to 25°45'N, 79°51.5'W (180 fm), 25°12.5'N, 80°02'W (250-300 fm), 25°04'N, 80°03'W to 25°08'N, 79°59'W (175 fm) (Dobkin, 1965).

North of Cuba: 23°10'N, 79°33'W (280 fm) (Bullis & Thompson, 1965). Gulf of Mexico: "throughout the Gulf" (Bullis, 1965); 27°44'N, 85°09'W (254 fm), 27°41'N, 94°59'W (250-300 fm), 27°34.3'N, 93°10.2'W (220-300 fm), 26°58.5'N, 96°06.7'W (300-400 fm) (Springer & Bullis, 1956). Near Dry Tortugas, Florida: South of Dry Tortugas (type-locality; Schmitt, 1931), 24°29'N, 83°35'W (220 fm), 24°29'N, 83°27'W (220 fm), 24°28'N, 83°30'W (220 fm), 24°13'N, 82°35'W (300-305 fm) (Bullis & Thompson, 1965); 24°23'N, 83°22'W (200 fm), 24°20'N, 83°20'W (150-350 fm) (Springer & Bullis, 1956). Off Nicaragua: 13°30'N, 82°00'W (275-300 fm), 13°18'N, 82°12'W (350 fm), 13°13'N, 82°13'W (350 fm), 12°33'N, 82°20'W (350 fm) (Bullis & Thompson, 1965).

The present material extends the known range of the species considerably to the south and southeast.

Vertical Distribution.—The species was collected between 165 and 459 fathoms (= 300 and 837 m), with the highest frequency of occurrence between 165 and 350 fm (= 300 and 638 m). There is one exceptional record from 43 to 47 fm (GERDA sta. 834); the occurrence of the species at this depth, however, needs confirmation. The nature of the bottom at which the species was taken is given as: mud (PILLSBURY sta. 381; OREGON sta. 1407), gray mud (OREGON sta. 542; COMBAT sta. 193; PELICAN stas. 17, 27, 31, 46, 54), light gray mud (OREGON sta. 1539), gray mud and shells (OREGON sta. 549), green mud (COMBAT stas. 120, 186, 329), blue mud (OREGON sta. 489, PELICAN stas. 13, 20), yellow mud (OREGON sta. 1915), mud and sand (OREGON sta. 532), coral and mud (OREGON sta. 1015), gray sand (PELICAN sta. 18), coral (OREGON sta. 1916), rock (OREGON sta. 1351). The species clearly seems to prefer a muddy bottom and in this respect differs from the closely related *Glyphocrangon spinicauda*, which is usually found on a coarser bottom of sand, shells, etc.

Larval Development.—Dobkin (1965) described and figured larvae of the present species under the name *Glyphocrangon spinicauda* "Form B."

Type-Material.—The holotype, an ovigerous female (cl. 52 mm) from South of Dry Tortugas, Florida (depth 180-220 fm, R/V ANTON DOHRN; trawled, 31 July 1930, leg. W. L. Schmitt) is preserved in the U. S. National Museum under catalogue number 65948.

Remarks.—With *Glyphocrangon spinicauda* and *G. haematonotus*, the present form forms a group of species which are very close and have been confused with one another. *G. longleyi* is the most robust of the three, with the tubercles and sculpture blunter and wider. The differences between the three species have already been given above.

All but one of the specimens from PELICAN sta. 17 referred by Bullis & Thompson (1965) to the present species proved, upon examination, to belong to *G. haematonotus* (see pp. 315, 317); the remaining specimen, an ovigerous female, indeed was *G. longleyi*. On the other hand, the specimens from OREGON stas. 1324, 1908, 1915, and 1923, and part of those from stas. 1916 and 1919, those from COMBAT sta. 120 and PELICAN sta. 54, reported upon by the same authors as *G. spinicauda*, proved to be *G. longleyi*.

***Glyphocrangon haematonotus*, new species**

Figs. 6, 7

Glyphocrangon longleyi Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8 (p.p.).

Glyphocrangon spinicauda Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8 (p.p.).

Material Examined.—Off South Carolina, U. S. A.: ALBATROSS sta. 2628, 1 juvenile paratype (USNM); sta. 2676, 1 paratype (USNM).—Off Georgia, U. S. A.: ALBATROSS sta. 2668, 1 paratype (USNM).—Off the east coast of Florida, U. S. A.: ALBATROSS sta. 2664, 11 paratypes (USNM); PILLSBURY sta. 89, 11 paratypes; PELICAN sta. 11, 5 paratypes (USNM); sta. 27, 3 paratypes (USNM).—Straits of Florida, U. S. A.: GERDA sta. 61, 3 ovigerous paratypes; sta. 62, 1 ovigerous paratype; sta. 66, 2 ovigerous paratypes; sta. 67, 6 female paratypes (4 ovigerous); sta. 76, 2 female paratypes (1 ovigerous); sta. 77, 2 ovigerous paratypes; sta. 93, 1 female paratype; sta. 131, 1 juvenile paratype; sta. 144, 1 juvenile paratype; sta. 160, 4 male paratypes; sta. 161, 60 paratypes (27 ovigerous); sta. 164, 35 paratypes (3 ovigerous); sta. 170, 2 paratypes; sta. 171, 4 paratypes; sta. 175, 62 paratypes; sta. 197, 1 female paratype; sta. 221, 2 male paratypes; sta. 222, 1 ovigerous paratype; sta. 228, 1 female paratype; sta. 299, 4 ovigerous paratypes; sta. 300, 1 ovigerous paratype; sta. 302, 2 ovigerous paratypes; sta. 382, 24 paratypes (3 ovigerous); sta. 483, 6 paratypes (4 ovigerous); sta. 649, 1 ovigerous female holotype (USNM Cat. No. 128950), 11 paratypes (1 ovigerous); sta. 652, 8 paratypes; sta. 654, 2 paratypes; sta. 658, 6 paratypes; sta. 659, 4 paratypes; sta. 855, 1 ovigerous paratype; sta. 998, 46 paratypes (2 ovigerous); sta. 999, 21 paratypes; OREGON sta. 1354, 2 ovigerous paratypes; COMBAT sta. 445, 3 paratypes (USNM); PELICAN sta. 17, 20 paratypes (14 ovigerous) (USNM).—N of the Bahama Islands: GERDA sta. 181, 1 juvenile paratype; sta. 182,

1 juvenile paratype; sta. 403, 1 paratype; sta. 406, 24 paratypes.—SW of Dry Tortugas, Florida, U. S. A.: 200 fm, F. Chase, 1 female paratype.—Off Atlantic coast of Colombia: PILLSBURY sta. 374, 100 paratypes (39 ovigerous).—Off Anguilla: PILLSBURY sta. 989, 1 ovigerous paratype.—Off St. Vincent: PILLSBURY sta. 881, 4 male paratypes.

Description.—Between the ridges and the tubercles, the body is covered with a dense and very short pubescence. The rostrum is narrow and rather deeply channeled. The distance between the teeth of the anterior pair is 0.5 to 0.6 times the distance between the anterior and posterior pairs of rostral teeth. Between the anterior teeth the rostrum is distinctly concave, the teeth being hardly directed outward. There is a short, but noticeable, hairy fringe across the base of the rostrum. In adult specimens the tip of the rostrum is decidedly longer than the basal part, and as long as the distance between the anterior and cervical grooves measured dorsally. In young specimens the tip of the rostrum is relatively longer.

The six tubercles of the anterior submedian carina are sharply pointed, with a distinct dorsal crest, and without a reticulate pattern. Along the inner side there are no tubercles, or only a few inconspicuous tubercles. Along the outside there are sometimes also one or two inconspicuous tubercles, all obscured by the pubescence of the carapace. The posterior submedian carinae have toothlike tubercles similar to those of the anterior carina. The anterior intermediate carina consists of three or four sharply pointed tubercles placed in a single row. Between, and slightly above, the first and second there is a small, sometimes blunt, sometimes sharp, tubercle, while a second such tubercle is placed slightly behind and above the last of the larger tubercles. One to three small blunt tubercles are placed below the carina. The posterior intermediate carina consists of five tubercles, of which the anterior two end in a sharp point. The anterior antennal carina is absent and is not represented by tubercles. The posterior antennal carina is straight and usually ends in a distinct sharp tooth; sometimes this tooth is rectangular, rarely it is indistinct. The anterior lateral carina begins slightly above the anterior end of the posterior and ends practically at the base of the branchiostegal spine. It carries two distinct, winglike expanded teeth, the anterior of which is larger, but fails to attain the level of the posterior margin of the orbit. The posterior lateral carina is straight, but for two tubercular indentations in its extreme proximal part. It ends in a sharp, or in a rectangular, tooth. The anterior sublateral carina is distinct; the posterior is short and is posteriorly continued in a few tubercles. The anterior and posterior submarginal carinae are separated by the lateromarginal groove. The posterior submarginal carina practically touches the marginal carina at the posterolateral angle, and is continued posteriorly as a short row of tubercles. The lateromarginal and postero-

marginal carinae are in contact through a very narrow space at the postero-lateral angle. The antennal spine is directed forward and for its full length stays to the inside of the branchiostegal spine; it is much shorter and narrower than the latter. Two inconspicuous ridges extend from the branchiostegal spine backward. The lower of these connects with the anterior lateral ridge, while the other runs close to and parallel with it.

The tubercles on the abdomen are sharper and higher than in *G. longleyi*; they are often carinate. The three large teeth on the first abdominal somite, as well as the anteromedian of the second and third, are large, laterally compressed, carinate dorsally, and end in a sharp anterior point. Between the median and intermediate teeth of the first somite, there is a single transverse row of tubercles, which extends along the posterior margin of the segment. The median tubercles of the somites are dorsally ridged and together form a median carina over the abdomen, which carina is interrupted at the margins and in the middle of each somite (including the sixth). The median carinae of the third to sixth somites are posteriorly produced; in somites 3 and 4 they are only slightly so, forming rounded processes; in somites 5 and 6 these processes are sharply angular; in the sixth somite it is even strongly produced as a large sharp tooth. The fifth somite shows two submedian carinae in the posterior half; these carinae diverge at first slightly, then more strongly, and reach to the posterior margin of the somite. The anterior part of the dorsal carina of the sixth somite, like the posterior, ends in a sharp tooth. The pleuron of the first somite is rather narrow and ends in a rounded, anteriorly directed top. That of the second somite is wide and ends in three teeth, of which the anterior is rectangularly rounded, the other two are pointed. The pleura of the third, fourth, and fifth somites end in two sharp spines; in the third and fourth somites the anterior spine is longest, in the fifth the posterior. The lateral margin of the sixth somite ends in a single sharp spine. The arrangement and the shape of the ridges on the lateral surface of the sixth abdominal somite differs considerably from that in the previous two species. The two central lateral ridges are undivided; they lie in one line, or the posterior is slightly higher. Also, the lower ridge is entire. No additional tubercles are noted. The basal tooth of the telson is distinct, with a narrowly rounded top. The carinae on the telson are sharp and smooth, without tubercles or serrations.

The eyes are somewhat smaller than those of *G. longleyi*. The peduncle bears a small tubercle on the inner margin, near the base of the cornea.

The scaphocerite is oval; it is somewhat more slender than in *G. longleyi*. In adult specimens the tooth, present in the lower part of the outer margin in young specimens, disappears entirely. The antennal peduncle reaches almost to the end of the scaphocerite.

The third maxilliped reaches slightly beyond the end of the scaphocerite. It is quite similar in shape to that of *G. aurantiaca*.

The first leg is quite typical. The right second leg reaches with part of the carpus beyond the scaphocerite. The carpus has about 30 articles. The left second leg is shorter and more robust than the right; its carpus has only about 20 articles. The third leg reaches about to the end of the scaphocerite. The dactylus is less than $\frac{1}{3}$ as long as the propodus, and is only slightly flattened. The propodus does not carry a tuft of hairs distally. The carpus is about $\frac{2}{3}$ as long as the propodus, and about half as long as the merus. In the fourth leg, which reaches about as far forward as the third, the dactylus is somewhat more flattened; it measures about $\frac{1}{3}$ of the length of the propodus. It is ovate in dorsal view and ends in a simple point. Its upper surface bears a longitudinal median groove in the distal half; this groove carries a row of soft hairs and ends in a small tuft of short hairs. The propodus ends in a long tuft of hairs, which are only slightly shorter than the dactylus. The carpus is far more than half as long as the propodus and about half as long as the merus. The fifth leg resembles the fourth. A median tubercle is placed on the fifth thoracic sternum in the males. It is absent in the females.

The pleopods and uropods are similar to those of *G. aurantiaca*.

Size.—The smallest specimen examined is a juvenile with cl. 9 mm. The largest measured male has a carapace 41 mm long. Ovigerous females had the carapace length varying from 35 to 55 mm (mostly from 40 to 45 mm). The eggs have a diameter of 2.5 to 3.5 mm.

Colour.—The rostrum is whitish with a red apex; the basal lateral spines, and sometimes also the distal, are also red. The lateral margin of the rostrum is reddish in its basal part. On the carapace, the tubercles of both the anterior and posterior submedian and intermediate carinae, as well as the additional tubercles between them, are red or orange red. All the other carinae are uncoloured. The antennal and branchiostegal spines are red, being darkest at the apex. The tubercles and carinae of the abdominal tergum are orange red. The posterior margins of the terga, especially in the posterior somites, are a darker red. The pleura are whitish or pink; in some specimens, the margins and spines are darker. In very dark specimens, the pleura of the fifth and sixth somites are dark red. In these same specimens, the entire tail fan, which usually is whitish or greyish with red carinae, is entirely red.

The first two segments of the antennular peduncle are pink (the first sometimes is red), the third is white. The antennular and antennal flagella are pink, or (in dark specimens) red. The antennal peduncle is pink, with the distal part sometimes red. The scaphocerite shows a red band along the outer margin and the basal part of the inner margin.

The mouthparts are red or pink. The first pereopod is likewise red. The second pereopod is pale red in the basal part as far as the merus; the

carpus and chela are white. Also the third to fifth pereopods are red or pink at the base, with merus, carpus, and the larger part of the propodus white or very light pink, while the distal part of the propodus and the dactylus are orange.

The pleopods are pink or whitish. The eggs are blue or greenish.

There is some variation in the extent and intensity of the red colour in this species. In one very dark specimen, the rostrum is almost entirely red, and all the legs are reddish or red; also, the antennular peduncle in this specimen is reddish. But the teeth on the anterior lateral carinae, and all carinae below the intermediate remain uncoloured, as also the base of the antenna and part of the scaphocerite.

The species differs from *G. longleyi* in that the posterior submedian carina is always entirely red.

Horizontal Distribution.—The species is only known from the present material enumerated above; its known range extends from the east coast of South Carolina and the Bahama Islands to the Caribbean coast of Colombia and St. Vincent.

Vertical Distribution.—So far, *Glyphocrangon haematonotus* has been taken at depths between 135 and 528 fm (= 247 and 966 m); the shallowest tow in which it was taken was from 113 to 135 fm (= 206 to 247 m). The species was most frequently found between 180 and 410 fm (= 329 and 749 m). The bottom at the stations where the species was taken consisted, as far as is known, of gray mud (PELICAN stas. 17, 27), white mud (PELICAN sta. 11), coral and mud (COMBAT sta. 445), yellow mud (ALBATROSS sta. 2628), green ooze and gray sand (ALBATROSS sta. 2676), gray sand and dead coral (ALBATROSS sta. 2668), coral sand (ALBATROSS sta. 2664).

Type-Material.—The holotype is an ovigerous female (cl. 44 mm) from GERDA sta. 649, Straits of Florida, 26°34'N, 79°43'W, 270 fm, 15 July 1965. It is now preserved in the collection of the U. S. National Museum under the catalog number 128950. The other specimens enumerated here are paratypes.

Remarks.—Some of the present material has been listed by Bullis & Thompson (1965) as *Glyphocrangon longleyi* (viz., part of specimens of PELICAN sta. 17), and as *G. spinicauda* (the material of COMBAT sta. 445).

Glyphocrangon neglecta Faxon, 1896

Fig. 9

Glyphocrangon neglecta Faxon, 1896, Bull. Mus. comp. Zool. Harv., 30: 159, pl. 1, figs. 5, 6.—De Man, 1920, Siboga Exped. Mon., 39 (a3): 215, 219.—Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8.

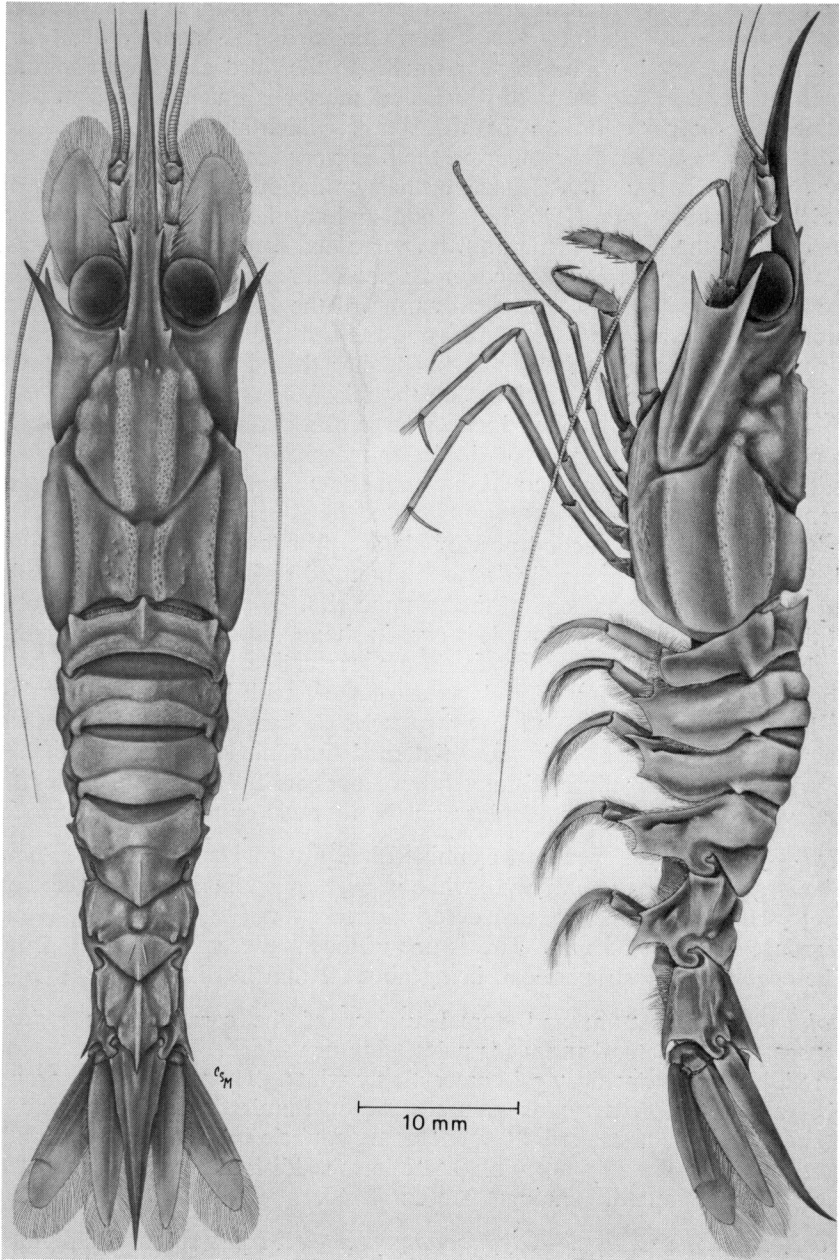
Material Examined.—S of Jamaica: PILLSBURY sta. 1256, 2 specimens (1 ovigerous).—Off Atlantic coast of Panama: PILLSBURY sta. 447, 53 specimens.—Off Atlantic coast of Colombia: PILLSBURY sta. 374, 76 specimens (35 ovigerous); sta. 381, 19 specimens; sta. 394, 1 specimen; sta. 776, 47 specimens (18 ovigerous); sta. 781, 19 specimens (2 ovigerous); sta. 784, 8 specimens (1 ovigerous).—Off Venezuela: PILLSBURY sta. 753, 7 specimens (2 ovigerous). OREGON sta. 1982, 8 specimens (USNM); sta. 2353, 39 specimens (USNM).—Off Grenada: BLAKE sta. 261, 1 holotype in poor condition (MCZ); sta. 265, 1 juvenile (MCZ).—Off Surinam: OREGON sta. 2007, 4 specimens (3 ovigerous); sta. 4301, 1 female; SNELLIUS sta. B24, 2 specimens (1 ovigerous) (RMNH).

Description.—This species is so distinctive that it can hardly be confused with any other member of the genus. Faxon's (1896) description and figure are adequate for its recognition.

The integument of the body is finely pitted between the carinae and tubercles; no pubescence is present. The rostrum is long and slender. The tip in the largest specimens is almost twice as long as the basal part. The distal part of the upper surface of the tip shows a median carina, the proximal part of the tip has a reticulate pattern of ridges. The basal part of the rostrum, between the two pairs of teeth, has the lateral margin broadly elevated, so as to form two wide marginal carinae. Both submedian carinae of the carapace have blunt and low tubercles. Also, the anterior intermediate carina consists of blunt tubercles. The posterior intermediate carina is straight, with a reticulate pattern and a blunt anterior end. The anterior antennal carina is well developed and ends in the antennal spine, a feature distinguishing this species from all other Atlantic species of *Glyphocrangon*. The antennal spine is much larger than the branchiostegal; it is directed more strongly outwards and reaches laterally beyond the latter. The posterior antennal and lateral ridges are straight; they are blunt anteriorly. The anterior lateral carina ends in the branchiostegal spine; it is straight and carries no teeth. The anterior sublateral carina runs very close to the lateral and fuses with it anteriorly. The posterior sublateral, and the anterior and posterior submarginal carinae are not very distinct. The lateral groove of the carapace does not reach the lateromarginal, which also is separated from the posteromarginal.

The first abdominal somite has the usual three dorsal teeth, the middle of which is sharp, the others blunt. Otherwise, there are hardly any tubercles on the first somite. Also, the second to fourth somites are practically smooth, with low and wide elevations instead of tubercles. The pleura of

FIGURE 9. *Glyphocrangon neglecta* Faxon, female from PILLSBURY sta. 374, in dorsal and lateral views.



the first somite are rounded; those of the second end in three teeth, of which the anterior one is bluntly rectangular, the median is acutely dentiform, and the posterior is wide and very small. In the third and fourth somites, the pleura end in two teeth, of which the anterior is much larger and more acute than the posterior. In the fifth somite, which also has two teeth, the situation is reversed: the anterior tooth is very small. The sculpture on the fifth and sixth somites is stronger than on the others. A median carina, which is lacking entirely in the second and third somites, makes its appearance in the middle of the fourth somite and extends over the fifth and sixth. The two posterior submedian carinae of the fifth somite do not reach the posterior margin. The median carina of the sixth somite is not interrupted at its base. The lateral surface of the sixth somite shows two central carinae, with the posterior somewhat higher than the anterior; the lower carina is not distinct. The ridges on the telson are smooth.

The eyes are well developed with a large black cornea. A small tubercle is present in the distal part of the inner margin of the peduncle.

The scaphocerite is ovate and does not show a tooth in any of my specimens.

The left and right second pereopods are practically equal in shape and size, and have the carpus divided into about 20 to 26 segments. The third leg reaches about to the end of the scaphocerite. The dactylus has about $\frac{1}{3}$ of the length of the propodus. It is oval in shape and ends in a single point; it shows a short distal groove on the upper surface. The propodus bears no distal brush of hairs. The dactylus of the fourth leg is more than half as long as the propodus and less than twice as long as the distal brush of hair of the propodus. It is more flattened than the dactylus of the third leg and shows dorsally a distinct groove over its full length. Neither the males nor the females have spines on the thoracic or abdominal sterna.

Size.—The smallest specimen examined had a carapace length of 11 mm. The largest male had cl. 35 mm, while in ovigerous females cl. ranged from 30 to 41 mm. In the original description, Faxon (1896: 160) gave the carapace length as 35 mm. This is one of the smaller species of the genus. The eggs are almost spherical, being about 2 mm in diameter.

Colour.—The rostrum and dorsal surface of the carapace are reddish orange, and the lateral surface is paler, pink or whitish. The antennal spine is reddish, the branchiostegal contrastingly white. The abdomen is orange pink above, with paler pink pleura. The antennular peduncle is pink or orange, the flagella are red. The antennal peduncle is whitish. The mouthparts are red. The legs are pink, sometimes reddish at the tips. The pleopods are uncoloured. The eggs are coral red.

Horizontal Distribution.—*Glyphocrangon neglecta* has so far been found only in the southern Caribbean (south of 17°30'N) and along the north

coast of South America (from Panama to Surinam). The present material was collected at numerous localities off the Caribbean coasts of Panama, Colombia, and Venezuela, from South of Jamaica, and off Surinam. The records in the literature are: Caribbean Sea between Honduras and Jamaica, 16°54'N, 81°18'W (250 fm) (Bullis & Thompson, 1965); off Montserrat, 16°43'45"N, 62°16'12"W (303 fm) (Faxon, 1896); off Grenada, 12°03'30"N, 61°47'10"W (291 fm) (Faxon, 1896); off Venezuela, 11°35'N, 62°41'W (212-250 fm) (Bullis & Thompson, 1965).

Vertical Distribution.—So far the species has been found between 200 and 576 fm (= 365 and 1050 m), most frequently between 200 and 400 fm (= 365 and 730 m). There is one record (SNELLIUS sta. B24) from a depth of 65 to 66 m (= 36 fm); it differs so widely from the other depth records for the species, that confirmation is needed before it can definitely be accepted. The various types of bottom from which the species was collected were noted to consist of: mud (PILLSBURY sta. 381; OREGON sta. 2353); mud with pteropod shells (PILLSBURY sta. 781); blue mud (OREGON sta. 2007); gray ooze (BLAKE sta. 265); sand and ooze (BLAKE sta. 260); sandy mud with clay and many shell fragments (OREGON sta. 4301); sand and broken shell, black specks (BLAKE sta. 153); coral (OREGON sta. 1885); shell and coral rubble (PILLSBURY sta. 753).

Type-Material.—The holotype is an ovigerous female collected from BLAKE sta. 261, off Grenada, 340 fm, and is preserved in the collection of the Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts, U. S. A., under Reg. No. 4434. The paratypes are a male from off Montserrat and a young specimen from off Grenada.

Glyphocrangon aculeata A. Milne Edwards, 1881

Fig. 10

Glyphocrangon aculeatum A. Milne Edwards, 1881, *Annls Sci. nat., Zool.*, (6) 11 (4): 5; 1883, *Rec. Fig. Crust. nouv. peu conn.*, pl. [39].—Holthuis, 1955a, *Zool. Verhand. Leiden*, 26: 131.

Rhachocaris Agassizii Smith, 1882, *Bull. Mus. comp. Zool. Harv.*, 10: 43, pl. 5, fig. 2, pl. 6, fig. 2; 1884, *Rep. U. S. Commr Fish*, 10: 365.

Glyphocrangon aculeata Bate, 1888, *Rep. Voy. Challenger, Zool.*, 24: 521, pl. 94, fig. 1.—Faxon, 1896, *Bull. Mus. comp. Zool. Harv.*, 30: 158.—Young, 1900, *Stalk-eyed Crust. British Guiana*: 460.—Moreira, 1901, *Archos Mus. nac., Rio de J.*, 11: 15.—De Man, 1920, *Siboga Exped. Mon.*, 39 (a3): 214, 216.—(p.p.) Boone, 1930, *Bull. Vanderbilt mar. Mus.*, 3: 179, pl. 67 (not pl. 66).—Dawson, 1965, *Mus. Rep., Gulf Res. Lab., Ocean Springs, 1963-1964*: 14.—Bullis & Thompson, 1965, *Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries*, 510: 8.

Glyphocrangon aculeatus Agassiz, 1888, *Bull. Mus. comp. Zool. Harv.*, 15: 45, fig. 242.

not *Glyphocrangon agassizii* Fowler, 1912, *Ann. Rep. New Jersey State Mus.*,

1911: 556 (error for *Ceraphilus agassizii* = *Sclerocrangon jacqueti* [A. Milne Edwards]).

Glyphocrangon (*Glyphocrangon*) *aculeata* Springer & Bullis, 1956, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 196: 13.

not *Glyphocrangon aculeata* Boone, 1927, Bull. Bingham oceanogr. Coll., 1 (2): 121, fig. 27 (= *G. spinicauda*; see also Glassell, 1934, Trans S. Diego Soc. nat. Hist., 7: 454).

Material Examined.—Off South Carolina, U. S. A.: ALBATROSS sta. 2677, 15 specimens (USNM).—N of the Bahama Islands: ALBATROSS sta. 2654, 1 juvenile (USNM); sta. 2656, 3 specimens (USNM); GERDA sta. 182, 1 female.—Straits of Florida, U. S. A.: GERDA sta. 121, 1 male, 3 juveniles; sta. 122, 3 females (2 ovigerous); sta. 126, 1 female; sta. 128, 2 males, 1 female; sta. 129, 1 male, 2 females; sta. 131, 4 males, 10 females (7 ovigerous); sta. 144, 1 female; sta. 223, 1 female; sta. 366, 1 ovigerous female; sta. 368, 1 male; sta. 370, 2 males, 1 female; sta. 374, 5 males, 4 females; sta. 375, 6 specimens; sta. 442, 2 females (1 ovigerous); sta. 443, 5 females (4 ovigerous); sta. 448, 1 juvenile; sta. 449, 4 males, 5 females, 3 juveniles; sta. 859, 3 specimens; sta. 867, 2 specimens (1 ovigerous); sta. 870, 4 ovigerous females; sta. 963, 3 specimens; sta. 1101, 1 female; sta. 1106, 1 ovigerous female; sta. 1107, 3 specimens (1 ovigerous); PILLSBURY sta. 634, 1 specimen.—W of Dry Tortugas, Florida, U. S. A.: BLAKE sta. 29, 1 specimen (MCZ).—Eastern Gulf of Mexico: OREGON sta. 1426, 2 specimens (USNM).—Western Gulf of Mexico: OREGON sta. 534, 5 specimens (USNM).—W of Jamaica: PILLSBURY sta. 1238, 1 specimen.—S of Jamaica: ALBATROSS sta. 2140, 2 specimens (USNM); BLAKE sta. VII, 1 specimen (MCZ); PILLSBURY sta. 1197, 4 specimens (2 ovigerous); sta. 1224, 2 specimens; sta. 1235, 1 specimen; sta. 1262, 2 specimens.—W of Haiti: PILLSBURY sta. 1178, 2 specimens; sta. 1187, 1 ovigerous female.—Off St. Croix, Virgin Islands: PILLSBURY sta. 1304, 1 specimen.—Off St. Kitts (= St. Christopher): PILLSBURY sta. 954, 1 male, 6 females (4 ovigerous); ALBATROSS sta. 2751, 1 specimen (USNM).—Off Aves Island: ALBATROSS sta. 2117, 1 specimen (USNM).—Off Guadeloupe: BLAKE sta. 163, 2 specimens (MCZ); sta. 174, 1 specimen (MCZ).—Off Martinique: BLAKE sta. 195, 1 specimen (MCZ); PILLSBURY sta. 892, 1 male, 1 juvenile.—Off St. Vincent: BLAKE sta. 227, 10 syntypes (MCZ).—Off Grenada: BLAKE sta. 265, 2 specimens (1 ovigerous) (MCZ); PILLSBURY sta. 847, 5 specimens.—Off Tobago: PILLSBURY sta. 844, 19 females (3 ovigerous).—Off Atlantic coast of Panama: PILLSBURY sta. 325, 1 specimen; sta. 448, 2 specimens (1 ovigerous).—Off Atlantic coast of Colombia: PILLSBURY sta. 388, 25 specimens (10 ovigerous); sta. 391, 24 specimens; sta. 407, 13 specimens (1 ovigerous); sta. 413, 12 specimens (2 ovigerous).—Off Venezuela: PILLSBURY sta. 741, 7 specimens (2 ovigerous); sta. 747, 1 female; sta. 754, 2 specimens.—Off British Guiana: PILLSBURY sta. 689, 7 specimens (4 ovigerous).—Off Surinam: PILLSBURY sta. 672, 1

ovigerous female, 2 juveniles; sta. 675, 25 specimens (10 ovigerous); sta. 682, 6 specimens (1 ovigerous).—Off Recife (= Pernambuco), Brazil: CHALLENGER sta. 120, 1 female (BM).

Description.—An excellent description and figures of this species were given by S. I. Smith (1882), who employed the name *Rhachocaris Agassizii* for it.

The dorsal surface of the body is glabrous, without any pubescence; it is extremely finely pitted. The tip of the rostrum in adults is slightly longer than the basal part, and slightly shorter than the distance between the anterior and cervical grooves measured dorsally. A median carina extends from the tip to the level of the basal pair of teeth. The margin of the rostrum is raised, and between the two pairs of teeth it forms a broad rounded carina. The basal part of the rostrum is distinctly concave, and the spines project upward and forward.

The tubercles of the submedian carinae of the carapace (six or seven anterior, three posterior) are laterally compressed and end in forward-directed sharp, or rather blunt, points. Also the anterior and posterior intermediate carinae have the tubercles (four and five, respectively) more or less dentiform; those of the anterior carina are, especially the anterior ones, sharply pointed. A few small tubercles are found between the carinae. The anterior antennal carina is totally absent, without any trace. The posterior antennal carina is straight, showing only two blunt serrations in its extreme posterior portion; it ends in a strong, somewhat winged, large, sharply pointed tooth. The anterior lateral carina is directed obliquely upward; it is large, winglike expanded, especially anteriorly, where it forms a single large tooth that ends in an extremely slender, sharp point. This tooth is about as long as, but far wider than the antennal spine, near the base of which it is situated. The posterior lateral carina shows two or three teeth in its basal part, but otherwise is straight; it ends in a rectangular point, which lies distinctly below the base of the anterior lateral carina and is practically level with that of the anterior sublateral carina. Between the posterior antennal and posterior lateral carinae there is a longitudinal row of small tubercles. The branchiostegal spine is longer, flatter, and higher than the antennal and diverges slightly more; it bears no carinae at all on its upper surface. The anterior sublateral carina is distinct. The posterior sublateral is short and continued posteriorly as two or three tubercles. The anterior submarginal carina is rather wide and quite distinct. The posterior submarginal is reduced to a row of about four tubercles along the postero-marginal groove. The lateral, lateromarginal, and postero-marginal grooves are in contact with another, except in one of the specimens where the anterior submarginal and posterior sublateral carinae are fused, blocking the lateral groove.

The teeth and tubercles on the abdomen are high and compressed. Apart

from the three large, sharply pointed teeth on the first somite, the tubercles and spines are blunt. The tubercles and spines in the median line of the abdomen form an effective median carina, which is interrupted at the ends and in the middle of the somites (also in the sixth somite). The central longitudinal carina on the lateral surface of the sixth somite is broken up into four to six short carinae or tubercles; a few small tubercles are placed above it. The lower carina is not broken up, but has an irregular upper margin. The pleuron of the second somite ends in the usual three teeth; the anterior of these, however, is low, rounded, and rather inconspicuous, the other two are sharply pointed. The pleuron of the fifth somite ends in two teeth.

The eyes are well developed, with large black corneas. A small tubercle is placed in the distal part of the inner margin of the eyestalk.

The scaphocerite is ovate and, even in the large specimens, shows a distinct tooth in the proximal third of the outer margin.

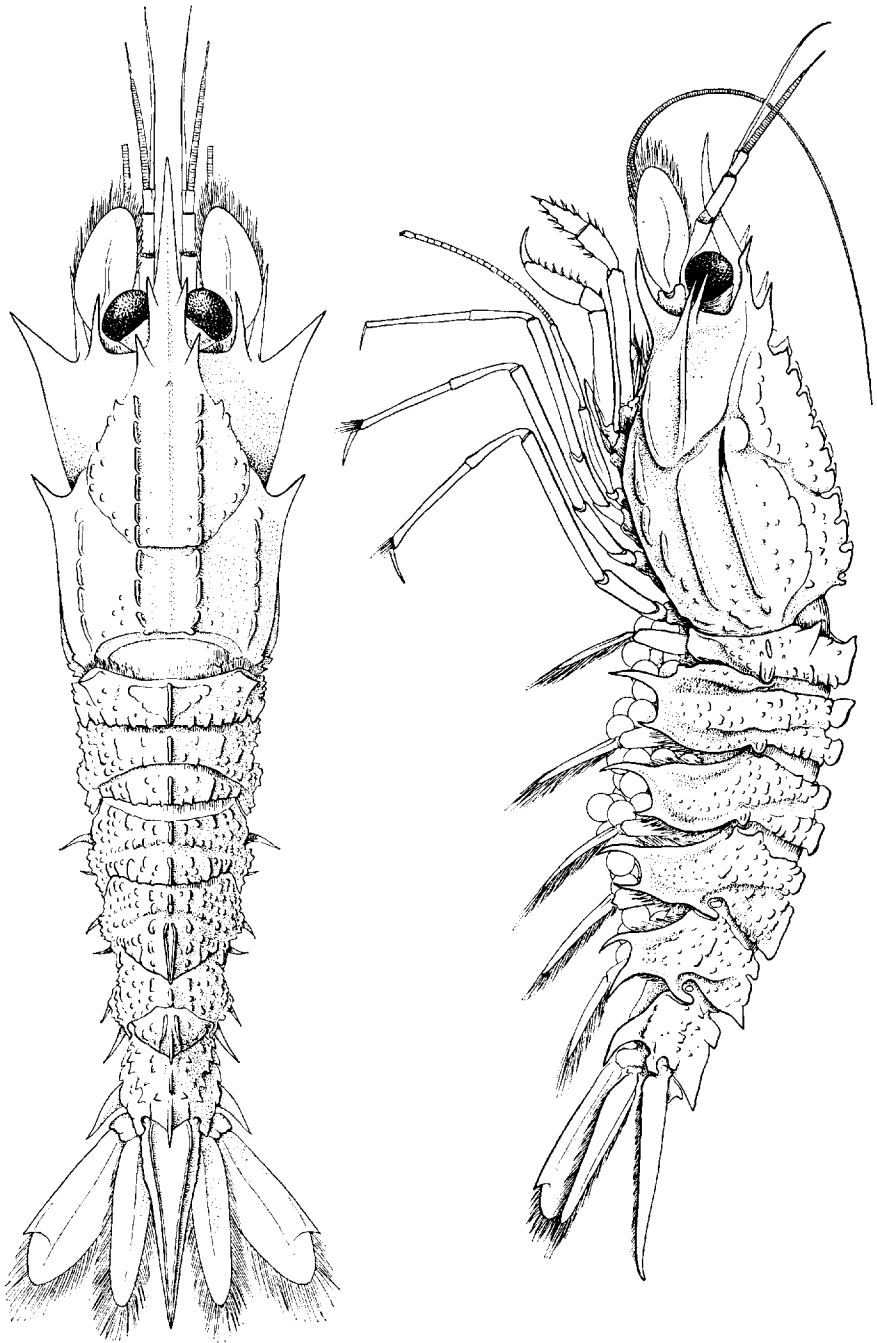
The left and right second pereiopods are about equally slender, but the right is the longer, often reaching beyond the scaphocerite with a good part of the carpus. The carpus has 25 to 29 articles. The left leg is shorter and has the carpus consisting of 19 to 22 articles. The dactylus of the third leg is about $\frac{1}{3}$ as long as the propodus, is oval in outline, and ends in a single point; the upper surface shows a longitudinal groove in the distal half. The dactylus of the fourth leg is about half as long as the propodus. It is oval, like that of the third, but is flatter and distinctly concave dorsally. The fifth thoracic sternite of the males shows a median tubercle bearing a few long hairs; in the females this tubercle is absent, but the tuft of hairs is there.

Size.—The smallest specimen examined had cl. 14 mm. The largest male had cl. 38 mm. Ovigerous females had cl. 36 to 49 mm. The diameter of the eggs is 2 to 3 mm.

Colour.—The rostrum is pink or pale orange, with the teeth, and sometimes also the top, red; the marginal carinae connecting the lateral teeth are also red. In dark specimens the entire rostrum, distally of a curved line that connects the bases of the proximal lateral teeth, is dark red. The tubercles and spines of the submedian and intermediate ridges of the carapace are orange red, or red. The posterior antennal carina is pink or (partly or entirely) orange red. The tooth of the anterior lateral carina has an orange tip; sometimes the entire carina is orange. All the other carinae are un-

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FIGURE 10. *Glyphocrangon aculeata* A. Milne Edwards, ovigerous female holotype of *Rhachocaris agassizii* Smith, from BLAKE sta. 326, in dorsal and lateral views, $\times 1.4$. (After Smith, 1886.)



coloured. The antennal and branchiostegal spines, as well as the entire area along the anterior margin of the carapace below the orbit, are dark red.

All tubercles of the abdomen are orange or orange red, with those on the dorsal part being darker than the more ventrally situated ones. The spines of the pleura are also orange red or orange. The posteromedian parts of the fourth, fifth, and sixth somites show a large central or two submedian red spots. Usually the sixth somite shows a somewhat darker red colour than the other somites, and the entire tail fan is about the same colour, often becoming darker distally.

The eyes in the adults are large and well pigmented. In juveniles, they are often whitish.

The antennulae and antennae are red, sometimes lighter distally. The flagella are red. There is a white spot on the base of the antennular peduncle. The scaphocerite is white, with a red band along the outer margin, which in some specimens is reduced to a red spot; in others, the entire scaphocerite is red, but for a white spot in the basal part.

The oral parts are dark red. The first pereopod has the chela and carpus dark red, and the merus and ischium a lighter colour. The second pereopod is white, with the carpus and chela pink or pale orange. The basal part of each of the following pereopods, as far as the ischium, is pink or reddish. The dactylus and the distal part of the propodus are pale orange.

The pleopods may have the protopod, or only its inner margin, pink; sometimes the entire pleopod is pink or red.

The eggs are greyish green or green.

Commensals.—Some specimens carry lepadids on the rostrum or carapace.

Horizontal Distribution.—The species is known from off Cape Hatteras (North Carolina, U. S. A.) to off Recife (northeastern Brazil), and from the entire Gulf of Mexico and Caribbean. The type-locality is off St. Vincent, West Indies. The records in the literature are: North Carolina, U. S. A.: south of Cape Hatteras, 33°42'15"N, 76°00'50"W (464 fm) (Smith, 1882). East coast of Florida, U. S. A.: off Miami (1100 fm) (Boone, 1930; either the locality or the depth is erroneous). Gulf of Mexico: west of Tortugas, 24°36'N, 84°05'W (955 fm) (Faxon, 1896); off Texas, 27°32'N, 93°01.6'W (400-450 fm) (Springer & Bullis, 1956; Bullis & Thompson, 1965). West Indies: south of Jamaica, 17°28'30"N, 77°30'00"W (610 fm) (Faxon, 1896); off Guadeloupe (878 fm) and 16°03'10"N, 61°52'20"W (769 fm) (Faxon, 1896); off Dominica, 15°18'12"N, 61°26'32"W (542 fm) (Faxon, 1896); off Martinique, 14°42'35"N, 61°13'15"W (501.5 fm) (Faxon, 1896); 14°31'55"N, 61°07'28"W (472 fm) (A. Milne Edwards, 1883); off St. Vincent (572 fm) (type-locality; A. Milne Edwards, 1881; Young, 1900); off Grenada,

12°03'55"N, 61°49'40"W (576 fm) (Faxon, 1896). Brazil: off Recife (= Pernambuco), 8°37'S, 34°29'W (675 fm) (Bate, 1888; Moreira, 1901).

Vertical Distribution.—The species has been caught at depths between 387 and 966 fathoms (= 707 and 1760 m); the shallowest station was at 371-387 fm. Most of the catches were made between 600 and 700 fm (= 1100 and 1280 m). A. Milne Edwards (1881) reported the types from 593 fm, but this evidently is an error for 572 fm, the depth of BLAKE sta. 227, at which the syntypes were taken (none of the early BLAKE stations gives a depth of 593 fm). Boone's (1930) record of the species from 1100 fm is doubtful, as no such depths are found "off Miami" whence she reported her material. The various bottoms on which the species has been taken have been described as: gray ooze (BLAKE sta. 265); *Globigerina* ooze (BLAKE sta. 326); blue *Globigerina* ooze (ALBATROSS sta. 2751); yellow ooze and black specks (ALBATROSS sta. 2654); ooze and sand (BLAKE sta. 163); sand and ooze (BLAKE sta. 227); fine sand, ooze, and black specks (BLAKE sta. 195); mud (OREGON sta. 1426); gray mud (OREGON sta. 534); clayey gray mud, with much debris (PILLSBURY sta. 413); green mud (ALBATROSS sta. 2677; PILLSBURY sta. 407); yellow mud and fine sand (ALBATROSS sta. 2117); yellow clayey mud, with much log debris (PILLSBURY sta. 1178); red mud (CHALLENGER sta. 120); slippery brown mud, with numerous very old and broken dead bivalve shells (PILLSBURY sta. 391); hard brown mud covered with siliceous sponges and branching *Madreporaria* (PILLSBURY sta. 689); heavy brownish clay (PILLSBURY sta. 388); sand (ALBATROSS sta. 2140; BLAKE sta. 200); fine dark sand and black specks (BLAKE sta. 190); coral sand (BLAKE sta. VII); Foraminifera (ALBATROSS sta. 2656); bottom with much *Thalassia* debris, as well as terrestrial plant remains (PILLSBURY sta. 1238).

Type-Material.—The type-material of this species consists of 10 syntypes (nine of which have cl. 20 to 34 mm; in the tenth, the rostrum is broken) from BLAKE sta. 227, off St. Vincent, 13°10'10"N, 61°18'15"W, 572 fm, sand and ooze, 19 February 1879. The specimens are preserved in the Museum of Comparative Zoology, Harvard University, Cambridge, Mass., under Reg. Nos. 4049 and 4424.

Remarks.—The species was first described in 1881 by A. Milne Edwards. The description was short and left much to be desired. This was the reason that S. I. Smith, although he had consulted A. Milne Edwards's paper, did not recognize the species from the description, and described it again as a new species, *Rhachocaris Agassizii*. Smith's description and figures are excellent, and so far have not been surpassed. When A. Milne Edwards (1883) published the figures of his *Glyphocrangon aculeatum*, its identity

with *Rhachocaris agassizii* was recognized by Smith (1884: 365), who then gave up both his generic and specific names.

Fowler (1912: 556) listed under the genus *Glyphocrangon* several species, among which was *Glyphocrangon agassizii* (S. I. Smith). That Fowler was somewhat confused, here, is shown by the fact that his references pertain not to *Rhachocaris agassizii* Smith, but to *Ceraphilus agassizii* Smith, 1882 (= *Sclerocrangon jacqueti* [A. Milne Edwards, 1881]).

Boone's (1927: 121, fig 27) material assigned to *Glyphocrangon aculeata* is *G. spinicauda*, as shown above (p. 301). The material that the same author later (Boone, 1930: 179) brought to the same species actually belongs to two species; her Plate 66 shows *G. spinicauda*, and Plate 67 *G. aculeata*. From her description, it is clear that, in her lot of 13 specimens from off Miami, ten belong to the former species and three to the latter.

Glyphocrangon longirostris (Smith, 1882)

Figs. 11, 12, 13

Rhachocaris longirostris Smith, 1882, Bull. Mus. comp. Zool. Harv., 10: 51 (p.p.), pl. 5, fig. 1, pl. 6, fig. 1

Glyphocrangon longirostris Smith, 1884, Rep. U. S. Commnr Fish, 10: 365; 1886, Rep. U. S. Commnr Fish, 13: 608, 655, pl. 8, figs. 1, 2, pl. 9, figs. 3-5.—Stebbing, 1908, Ann. S. Afr. Mus., 6: 38.—Kemp, 1910, Sci. Invest. Fish. Br. Ireland, 1908(1): 170.—Stebbing, 1910, Ann. S. Afr. Mus., 6: 388.—Fowler, 1912, Ann. Rep. New Jersey State Mus., 1911: 557.—De Man, 1920, Siboga Exped. Mon., 39(a3): 214, 217.—Balss, 1925, Wiss. Ergebn. dt. Tiefsee-Exped. 'Valdivia', 20: 295.—Barnard, 1950, Ann. S. Afr. Mus., 38: 721, fig. 134 e-g.—Marshall, 1954, Aspects Deep-Sea Biol.: 329.—? Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8.

Glyphocrangon sculptus Smith, 1884, Rep., U. S. Commnr Fish., 10: 365 (p.p.).

Glyptocrangon longirostris Williamson, 1915, Nordisches Plankton, 6: 392.

Glyphocrangon nobilis? Stephensen, 1923, Rep. Dan. oceanogr. Exped. Mediterr., 2(D3): 80.

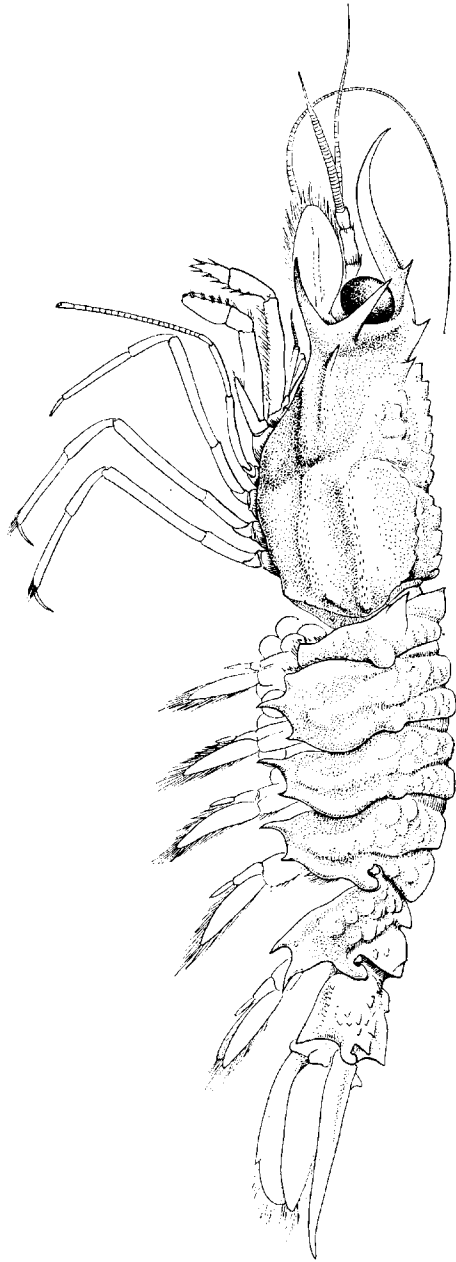
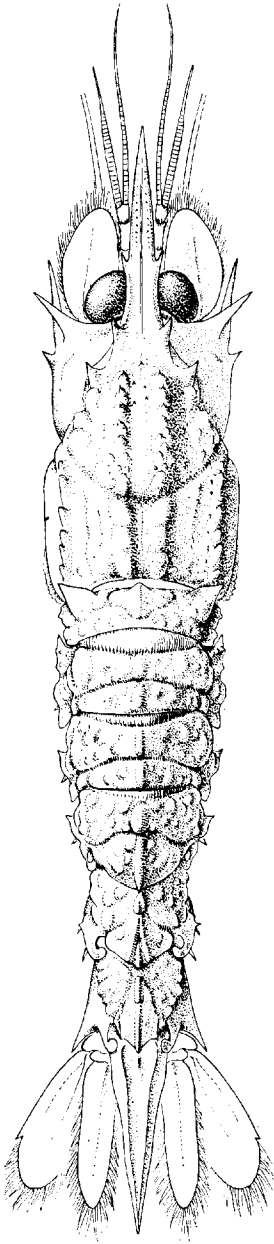
?*Glyphocrangon* sp. Bourdon, 1967, Bull. Mus. Nat. Hist. nat. Paris, Ser. 2, 38: 857.

not *Glyphocrangon longirostris* (?) McGilchrist, 1905, Ann. Mag. nat. Hist., Ser. 7, 15: 238 (= *G. assimilis* De Man).

Material Examined.—WESTERN ATLANTIC: E of Massachusetts, U. S. A.: ALBATROSS sta. 2077, 1 male (MCZ); sta. 2706, 1 juvenile (USNM).—E of New York, U. S. A.: ALBATROSS sta. 2530, 1 specimen (USNM).—E of New Jersey, U. S. A.: ALBATROSS sta. 2205, 1 ovigerous female (USNM); sta. 2206, 1 male (USNM); sta. 2550, 2 specimens (USNM).—Off Cape Hatteras, North Carolina, U. S. A.: BLAKE sta. 330, 1 lectotype female

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FIGURE 11. *Glyphocrangon longirostris* (Smith), adult female from ALBATROSS sta. 2205, in dorsal and lateral views, $\times 1.4$. (After Smith, 1886.)



(MCZ).—Eastern Gulf of Mexico: ALBATROSS sta. 2381, 1 specimen (USNM); sta. 2383, 1 specimen (USNM).—St. Croix Basin, Virgin Islands: PILLSBURY sta. 1304, 3 specimens.

EASTERN ATLANTIC: W of Brittany, France: 48°04'N, 12°40'W, 4000 m, "Yngeltrawl," 1800 m.w., THOR Exped., 2 September 1906, 5 males, 3 females (2 ovigerous).—Off Brittany, France: Centre Océanologique de Bretagne, sta. CHO4-BO19-Put 124, 1 female (COB).—W of Strait of Gibraltar: 35°43'N, 8°16'W, 2156-2360 m, SKAGERAK Exped., 28 May 1946, 1 female (MC).—Off Southern Liberia, West Africa: PILLSBURY sta. 76, 2 males.—Off Nigeria, West Africa: PILLSBURY sta. 233, 4 specimens; sta. 309, 46 specimens (22 ovigerous); sta. 314, 1 specimen.

Description.—The rostrum is long and reaches with one fourth to almost half of its length beyond the scaphocerite. It is slender, with the tip curved upwards. The tip is 1.5 times to almost twice as long as the basal part, and 0.8 to 1.5 times as long as the distance between the cervical and anterior grooves. There are two pairs of lateral rostral teeth. Behind the anterior lateral teeth the lateral margin is raised, whereby the upper surface becomes concave. The distal part is flat, or even slopes down from the raised median carina. This carina extends from the tip of the rostrum to slightly in front of the posterior lateral rostral teeth. The dorsal surface of the distal part of the rostrum shows many depressions and elevated parts, giving it a corrugated appearance. These corrugations are quite typical for the species.

The anterior submedian ridges are distinct, with six or seven conical, pointed or blunt tubercles. At the inner side of each of these ridges there is a row of about six small, often very inconspicuous, tubercles; some additional small tubercles may be present in the median area. A distinct median tubercle is placed just behind the anterior groove. To the outside of the submedian ridges, there is a row of seven or eight small, often inconspicuous, tubercles. The posterior submedian ridges each consist of four or five pointed or blunt conical tubercles; the last of these slightly overhangs the posterior groove. At the inner side of the ridges, there is a row of three or four blunt, often inconspicuous, tubercles. On the outside, there are three or four indistinct tubercles. A row of about five small, blunt tubercles stands in the space between the posterior submedian and posterior intermediate carinae, while some other similar tubercles are placed closer to the intermediate carina.

The anterior intermediate carina bears three or four sharp, spinous tubercles. The anterior of these is largest and quite sharp. These four tubercles are placed in a curved line that is convex externally. To the inner side of the carina, there is a row of about three small tubercles. To its outside, there are a few scattered tubercles. The posterior intermediate carina bears

five or six strong, conical, pointed tubercles. To the outside, there may be a few small scattered tubercles. Two of the three largest of these tubercles are placed just behind the cervical groove, the third just before the posterior groove; sometimes these tubercles are very inconspicuous.

The posterior antennal carina is pitted, but shows no teeth or tubercles, and ends bluntly anteriorly. A row of two, often inconspicuous, blunt tubercles extends upward from the anterior end of this carina along the posterior margin of the cervical groove. The anterior antennal carina is indicated by a few inconspicuous tubercles.

The posterior lateral carina is without tubercles, but its surface is pitted. Anteriorly, it slopes down gradually towards the cervical groove, without a trace of a tooth or tubercle. The anterior lateral carina ends in a distinct sharp tooth at the base of the branchiostegal spine and at the level of the anterior groove.

The branchiostegal spine is large, slender, and sharply pointed. It is distinctly longer than the antennal spine and directed more forward, less outward. From the tip of the branchiostegal spine, two narrow and low, but rather distinct, carinae lead backward; the upper of these ends in the anterior lateral, the lower in the anterior sublateral carina.

The anterior sublateral carina is distinct and longer than the anterior marginal, which is about as distinct as the posterior sublateral. The posterior lateral and anterior sublateral carinae are almost in one line. The posterior submarginal and the posterior sublateral merge and form a forked carina, which stops at the posterolateral angle of the carapace. Between this angle and the base of the posterior lateral carina, a few tubercles are placed along the anterior margin of the posterior groove.

The first abdominal somite bears three large dorsal teeth—one median and two lateral. The teeth are somewhat laterally compressed, sharply pointed, and directed forwards. The lateral teeth are placed in one line with the posterior intermediate carinae. Blunt tubercles are present between, behind, and to the outside of the teeth. The pleura are straight anteriorly, rounded posteriorly and distally. They show a short carina close to, and parallel with, the lateral margin. The anterior half of the following somites is smooth, and this half disappears under the preceding somite in the fully stretched animal. The posterior part of the second to fourth somites is divided in two by a transverse groove. Before and behind this groove there are some tubercles. Those in the median line are short and ridgelike in the second and third and the anterior part of the fourth somite; in the posterior part of the fourth somite, they form a long, distinct carina, which posteriorly ends in a distinct angle. The tuberculation of the anterior part of the somites continues onto the pleuron, but stops short before reaching the distal margin. The end of this tuberculated area in the second somite is formed by a large rounded tubercle, before which the pleuron is

rather deeply hollowed. In the third and fourth somites, the end of the tuberculated area on the pleuron forms a wide, ridgelike, transverse tooth, against which the posterior margin of the preceding pleuron rests when the abdomen is most strongly curved. The pleuron of the second somite ends in a sharp, slender tooth, which at either side is flanked by a shorter and blunter, more triangular tooth or blunt angle. In the third and fourth somites, the pleuron ends in two sharply pointed teeth, the anterior of which is longer and sharper than the posterior. The fifth somite has the posterior median ridge short and sharp, ending in a rather blunt point; the anterior part is also sharp and ends bluntly posteriorly. Both are short and separated by a considerable distance. The dorsal submedian carinae start right behind the anterior median carina and continue almost to the posterior margin of the somite; they are high anteriorly, becoming gradually lower posteriorly. The lateral part of the upper surface bears several tubercles. In the upper part of the pleuron, there is an oblique ridge similar to the ridgelike teeth of the third and fourth pleura. The fifth pleuron ends in two slender, sharp teeth, of which the posterior is the longer; in some specimens there is a rudiment of a third tooth on the posterior margin. The sixth somite has the median carina well developed and ending posteriorly in a sharp triangular tooth, which reaches far over the base of the telson. The ridge is deeply notched in the basal third. The longitudinal ridge over the middle of the lateral surface of the sixth somite bears four or five large tubercles; the one in the middle may be placed just outside of the row. Two more tubercles are below and to the outside of the row, and some small scattered ones between it and the median ridge. Two short, longitudinal ridges are placed at the posterior margin of the somite, one just above, the other below, the articulation with the telson. A longitudinal ridge is visible in the anterior part of the base of the pleuron; it is rather irregular or tubercular. The pleuron ends in a sharp, slender, posteriorly directed tooth, from which an indistinct carina runs upward towards the base of the pleuron. The telson is slender. The two dorsal carinae are slightly serrate proximally. A distinct median basal tooth is present.

The eyes are very large. The cornea is large and swollen, being far longer and wider than the stalk. There is a small tubercle on the inside of the ocular peduncle, near the base of the cornea. In some specimens the colour of the cornea is dark, in others it is much lighter, but it never is as light as in *G. atlantica*.

The second segment of the antennular peduncle in the female is twice as long as the third. In the male, it is much shorter and more thickset.

The scaphocerite is oval, being slightly less than twice as long as broad. It reaches as far as the end of the antennular peduncle in the female, less far in the male. The antennal peduncle is slender and fails to reach the end of the scaphocerite, or reaches as far as its end.

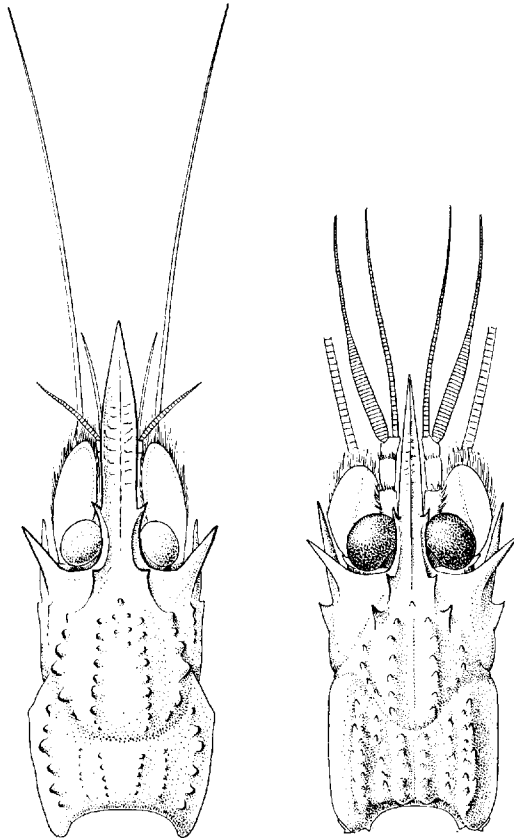


FIGURE 12. *Glyphocrangon longirostris* (Smith), dorsal view of anterior part of body: left, juvenile female lectotype from BLAKE sta. 330; right, male from ALBATROSS sta. 2206; $\times 1.4$. (Left, after Smith, 1882; right, after Smith, 1886.)

The third maxilliped reaches slightly beyond the antennal peduncle. The last two segments show large curved spines on the lateral margins and on the posterior surface. The first pereopods are subchelate; the propodus reaches about to the base of the last segment of the third maxilliped. The right second leg reaches slightly beyond the scaphocerite. The fingers of the chela are short; the chela itself is less than twice as long as high. The carpus consists of about 18 to 25 articles. The left leg is somewhat shorter and more heavy, and fails to reach the end of the scaphocerite; the carpus has 15 to 22 articles. The third legs reach with part of the propodus beyond the scaphocerite. The dactylus is simple, elongate ovate, and ends in

a blunt point; it measures $\frac{1}{3}$ to $\frac{1}{4}$ of the length of the propodus. The propodus does not end in a bundle of hairs. The carpus is about 0.7 times as long as the propodus, and $\frac{2}{3}$ as long as the merus. The fourth leg has the dactylus $\frac{2}{3}$ as long as the propodus. The latter ends in a bundle of hairs, which is somewhat less than half as long as the dactylus. The carpus is 0.6 to 0.7 times as long as the propodus and somewhat less than half as long as the merus.

The uropods have the endo- and exopod elongate ovate. The outer margin of the exopod shows a rectangular tooth just behind the diaeresis.

Size.—The carapace length of the examined specimens varied between 22 and 46 mm. In ovigerous females it was 37 to 42 mm. The two specimens with branchial bopyrids had cl. 29 and 33 mm. The lectotype has cl. 23 mm and evidently is juvenile. The total length of the animals given in the literature varies between 25 and 110 mm. The eggs are large and few; in my material they measured 2.7 mm by 2.7-3.2 mm, although one, probably an underdeveloped one, measured 2 by 2 mm. Smith (1885) gave the size of the eggs as 2.8 by 3.1 mm, and counted 86 eggs in one female.

Colour.—Various authors have commented on the colour of the eyes. Smith, in the original description, described the cornea of the young lectotype (cl. 23.0 mm) as: "In the alcoholic specimen . . . perfectly white." Later the same author (Smith, 1885), having larger specimens at his disposal, found the cornea there "dark purplish brown" and commented about the "dark-colored eyes as in the other species." Stebbing (1908) described the eyes as "long retaining a purplish hue." Kemp (1910) found the colour of the cornea of a freshly caught young specimen (total length 40 mm) to be "pale orange without a trace of black pigment." Stephensen (1923) stated that his "largest specimen has, (in spirits) brownish eyes; in the others the eyes are colourless." Barnard (1950) gave the colour of the eyes as "dull orange-brown after many years in formalin." It seems very likely that in young specimens the colour of the eyes is very pale, and that it becomes darker with age. This is also borne out quite well by the material examined by me. Kemp (1910) described the rest of the colour of his freshly caught juvenile as follows: "The animal was ivory-white in colour with a suffusion of pink on the rostrum, the anterior part of the carapace, the oral appendages and the first pair of pereopods." In Stephensen's (1923) decolorized specimens it was "plainly evident that the oral parts and the tips of many of the spines were originally red." Balss (1925) cited for the colour the following field notes: "Rücken graulichweiss, Extremitäten, Mundteile, Rostrum, Telson und Dornen des Panzers ziegelrot."

The specimens from PILLSBURY sta. 233 (off Nigeria) when just caught were noted to be coloured as follows: "Rostrum and anterior part of cara-

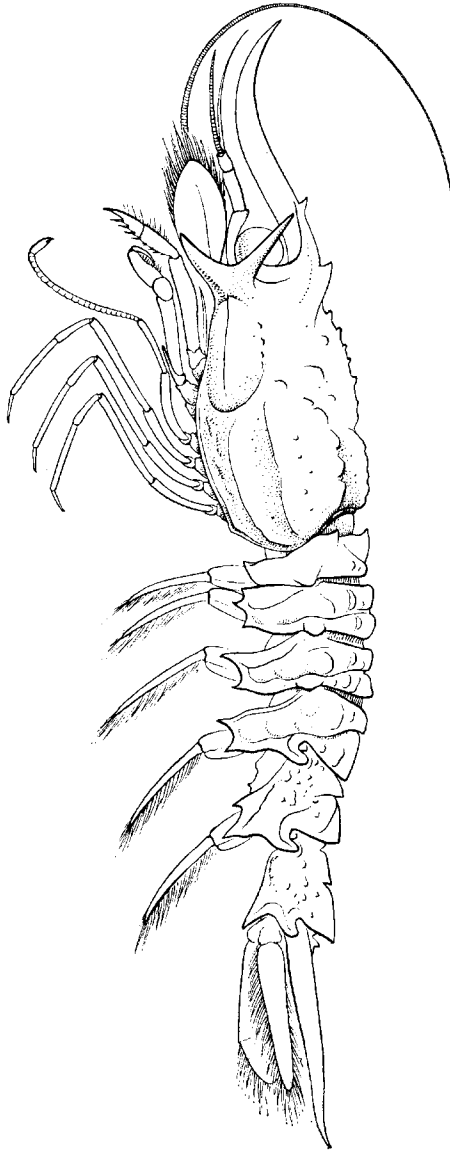


FIGURE 13. *Glyphocrangon longirostris* (Smith), juvenile female lectotype from BLAKE sta. 330, in lateral view, $\times 1.4$. (After Smith, 1882.)

pace bright orange. Cornea bright yellow with the eye peduncle orange. All appendages from the antennulae to the fifth pereopods orange, the mouthparts and the first pereopods more reddish than the rest. The center of the basal half of the scaphocerite pale. Posterior part of carapace transparent, the often greenish intestines shining through. An orange band extends over the branchial region. The abdomen is pale orange. The pleura are darker than the tergum. Posteriorly the colour of the abdomen becomes darker, the tailfan and sixth abdominal somite being orange. Of the pleopods the exo- and endopod are orange, the protopod is lighter." The specimens from PILLSBURY sta. 309 (off Nigeria) were described as follows: "The dorsomedian part of carapace and abdominal somites greenish. Rostrum, antennal and branchiostegal spines as well as spines on the carapace pale orange. Posterolateral part of carapace and abdominal pleura pale orange. Eyestalks pink. Antennulae, antennae, mouthparts and legs orange." The colour of the specimens from the St. Croix basin were, immediately upon capture, noted to be as follows: "Rostrum and anterior part of the carapace (including the anterior end of the anterior submedian carinae, and the antennal and branchiostegal spines) reddish orange. Some small pale orange spots on the intermediate carinae, a small orange spot just before the cervical groove above the base of the anterior lateral carina, and a larger pale orange spot behind the cervical groove, covering both the posterior antennal and lateral carinae. Abdomen white with some faint pink colour on the three large teeth of the first somite, along the posterior margins of the second to fifth somites and on some of the dorsal tubercles; the general impression of the abdomen is that it is uncoloured dorsally. The pleura are faintly pink distally, except for that of the fifth somite which is red along the margins and lighter on the rest of its surface. The tailfan is uncoloured, only the carinae of the telson are faintly pink. The eyes have the cornea dark with a golden sheen. The antennula is orange red; the broader flagellum shows a longitudinal white band. The antenna, inclusive of the flagellum, is orange red, but for a white spot in the basal part of the scaphocerite. The mouth parts and the first pereopod are red. The second pereopod is more orange red, the following legs being orange. The pleopods are orange pink, being darker distally than proximally. In the juvenile the basal part of the rostrum and the anterior part of the carapace are pale pink, while there is also a pale pink spot in the posterolateral area of the carapace. The antennular and antennal peduncles are pale pink; the flagella are white and a white spot is visible in the basal part of the scaphocerite. The mouthparts and the first pereopod are red." All these descriptions, although differing in details, give the same general colour pattern.

In preserved material, the eyes usually are paler than those of most other species.

Parasites and Commensals.—Two of the specimens from PILLSBURY sta. 309 (off Nigeria) carried bopyrid parasites in the branchial cavity. So far, no bopyrids had been reported from this species, but Bourdon (1967) described a new species of *Cabirops*, *C. serratus*, found parasitic on a species of *Bathygyge*, which itself was a parasite on a *Glyphocrangon* taken near the Canary Islands at 27°31'N, 16°27'W at 1918 m depth by the 1883 TALISMAN Expedition. Dr. Bourdon kindly informed me (*in litt.*, 1970) that the bopyrid *Bathygyge* examined by him was no longer attached to its glyphocrangonid host, and that the latter seems to be lost. Since the present species and *Glyphocrangon sculpta* seem to be the most common glyphocrangonids of the eastern Atlantic, and since bopyrids are found on both, it is possible that the specimen of *Glyphocrangon* taken by the TALISMAN was either *G. longirostris* or *G. sculpta*.

A heavily coiled, vermiform organism is present on the underside of the abdomen of a female with cl. 41 mm from PILLSBURY sta. 309 (off Nigeria); it is attached to the sternite of the second somite. This organism is similar to, but smaller and thinner than, the ones found on the rostrum and anterior part of the carapace of some specimens of *Glyphocrangon longleyi* (see p. 313). Its nature is unknown to me.

Horizontal Distribution.—The species has an extensive north-south distribution in the Atlantic Ocean, occurring from 50°47.5'N to about 34°S. The records in the literature are: Southwest of Ireland, 50°47.5'N, 11°43' W (900 fm) (Kemp, 1910); west of Brittany, France, 48°04'N, 12°40' W (Stephensen, 1923); east of Massachusetts, U. S. A., 41°09'40"N, 66°02'20" W (1255 fm) (Smith, 1884); east of New Jersey, U. S. A., 39°44'30"N, 70°30'45"W (1081 fm), 39°35'00"N, 71°24'30"W (1043 fm), 39°35'00"N, 71°18'45"W (1073 fm) (Smith, 1886); off Cape Hatteras, North Carolina, U. S. A., 35°41'03"N, 74°31'00"W (1047 fm) (type-locality; Smith, 1882; Smith gave the position of this station erroneously as 31°41'N, 74°35'W); ? off Nicaragua, 12°33'N, 82°20'W (350 fm) (Bullis & Thompson, 1965); ? off Surinam, 7°44'N, 54°40'W (350 fm) (Bullis & Thompson, 1965); ? near the Canary Islands, 27°31'N, 16°27'W (1918 fm) (Bourdon, 1967); between the Canary and Cape Verde Islands, West Africa, 24°35'N, 17°4' W (2500 m) (Balss, 1925); South Africa: Cape Point NE by E $\frac{3}{4}$ E 38½ miles (750-800 fm), Cape Point N 77° E (660-700 fm), Cape Point NE $\frac{3}{4}$ E 40 miles (720-800 fm) (Stebbing, 1908, 1910; Barnard, 1950); Cape Point N 58° E 49 miles (1646 m) (Stebbing, 1910; Barnard, 1950). Coutière (1911: 156; 1938: 265) reported *Glyphocrangon* from off the coast of Spain and Portugal, without giving any clue to the specific identity of his material; therefore, it is impossible to say whether the present or a different species was meant by him.

Vertical Distribution.—The species lives at great depth: all specimens known are taken from depths between 700 and 1371 fm (= 1280 and 2500 m). The shallowest tow in which the species was taken was at a depth of 660 to 700 fm. The material from 350 fm deep from off Nicaragua and Surinam brought to the present species by Bullis & Thompson (1965) is of uncertain identity (see below). Stephensen (1923) gave the depth at the station in which his specimens were taken as 4000 m, but indicated at the same time that the net had only 1800 m of wire. This would mean that his (adult) specimens were taken in midwater, which seems very unlikely. The bottom at the stations where the present species was taken is characterized as follows: gray ooze (ALBATROSS stas. 2205, 2530), gray ooze and Foraminifera (ALBATROSS sta. 2706), *Globigerina* ooze and clay (BLAKE sta. 330), blue mud (ALBATROSS sta. 2077), green mud (ALBATROSS sta. 2206; Stebbing, 1908), brown and green mud (ALBATROSS sta. 2383), brown mud (ALBATROSS sta. 2550), light brown mud (ALBATROSS sta. 2381).

Type-Material.—The type-material consists of two specimens, a larger (cl. 23 mm) juvenile female from BLAKE sta. 330 (off Cape Hatteras, North Carolina, U. S. A., 35°41'03"N, 74°31'00"W, 1047 fm, *Globigerina* ooze and clay) and a juvenile (total length 25 mm) from BLAKE sta. 315. The former is preserved in the Museum of Comparative Zoology, Harvard University, Cambridge, Mass., where I examined it in 1970. This specimen is now made the lectotype of *Rhachocaris longirostris* Smith, as Smith's original description and his figures are practically exclusively based on this specimen. The smaller specimen is preserved in the U. S. National Museum, and upon examination proved to belong to a different species, viz., *Glyphocrangon nobilis*.

Remarks.—Smith (1882) based the original description on the lectotype, which is a juvenile. Later the same author (Smith, 1886) gave additional details of the species based on adult specimens. As usual, his descriptions and figures are excellent.

One of the lots referred by Smith (1884) to *Glyphocrangon sculptus* (viz., the male specimen from ALBATROSS sta. 2077) proves actually to belong to *G. longirostris*. The specimen, which is in the Museum of Comparative Zoology, Harvard University, bears Smith's original label with the incorrect name, and a later label with the correct identification in a different handwriting (Faxon's ?). Smith's (1884) lots from ALBATROSS stas. 2035, 2095, 2102, and 2105, identified as *G. sculptus*, could also be examined and proved correctly named. His lots from ALBATROSS stas. 2051 and 2052, I have not seen (see also p. 286).

McGilchrist (1905) reported the species with some doubt from the Bay of Bengal, but De Man (1920) later showed that McGilchrist's specimens probably must be assigned to *Glyphocrangon assimilis* De Man.

Kemp (1910: 70) reported that in his juvenile, "arthrobranchs appear to be absent from the bases of the first two pairs of pereopods, in accordance with Alcock's definition of the subgenus *Plastocrangon* though not with McGilchrist's account of *G. longirostris* (?) from the Indian Ocean." Actually, McGilchrist also remarked that in his specimen the number of branchiae was reduced, but he evidently accidentally switched the terms pleurobranchs and arthrobranchs. In the three specimens of the present material, also the small ones, that I examined on this point, arthrobranchs were present at the bases of the first and second pereopods. It is difficult to find out whether these arthrobranchs are variable, or whether Kemp's specimen was abnormal.

The specimens from west of Brittany, which Stephensen (1923) brought with some doubt to *Glyphocrangon nobilis*, are preserved in the collection of the Copenhagen Museum and were kindly placed at my disposal by Dr. Torben Wolff. The collection of that museum contains another specimen, also identified by K. Stephensen as "*Glyphocrangon nobilis* (?)"; this specimen, obtained from the Göteborg Museum, was collected west of the Strait of Gibraltar by the Swedish SKAGERAK Expedition. All of Stephensen's material proves to belong to *G. longirostris* and not to *G. nobilis*. So far, *G. nobilis* has not been found in the eastern Atlantic.

Bullis & Thompson (1965) reported the present species from three stations made by the OREGON, viz., Nos. 1302, 1908, and 2010. The material of the first of these stations is in the U. S. National Museum and proved to be *Glyphocrangon nobilis*. The two other lots were not available, but as both came from depths far shallower (350 fm) than those usually producing *G. longirostris*, there is good reason to doubt the correctness of these identifications also.

Glyphocrangon nobilis A. Milne Edwards, 1881

Fig. 14

Glyphocrangon nobile A. Milne Edwards, 1881, *Annls Sci. nat., Zool., Ser. 6* 11(4): 5; A. Milne Edwards, 1883, *Rec. Fig. Crust. nouv. peu conn., pl.* [40], fig. 2.

Rhachocaris longirostris Smith, 1882, *Bull. Mus. comp. Zool. Harv., 10*: 51 (p.p.), not pl. 5, fig. 1, not pl. 6, fig. 1.

Glyphocrangon nobilis Faxon, 1896, *Bull. Mus. comp. Zool. Harv., 30*: 159 (p.p.).—Young, 1900, *Stalk-eyed Crust. British Guiana*: 459.—De Man, 1920, *Siboga Exped. Mon., 39* (a3): 215, 217.—Schmitt, 1935, *Scient. Surv. P. Rico, 15*: 170 (p.p.), fig. 33.

not ?*Glyphocrangon nobilis* Faxon, 1895, *Mem. Mus. comp. Zool. Harv., 18*: 142 (= *G. vicaria* Faxon, 1896).—Stephensen, 1923, *Rep. Dan. oceanogr. Exped. Mediterr., 2* (D3): 80 (= *G. longirostris* [Smith, 1882]).

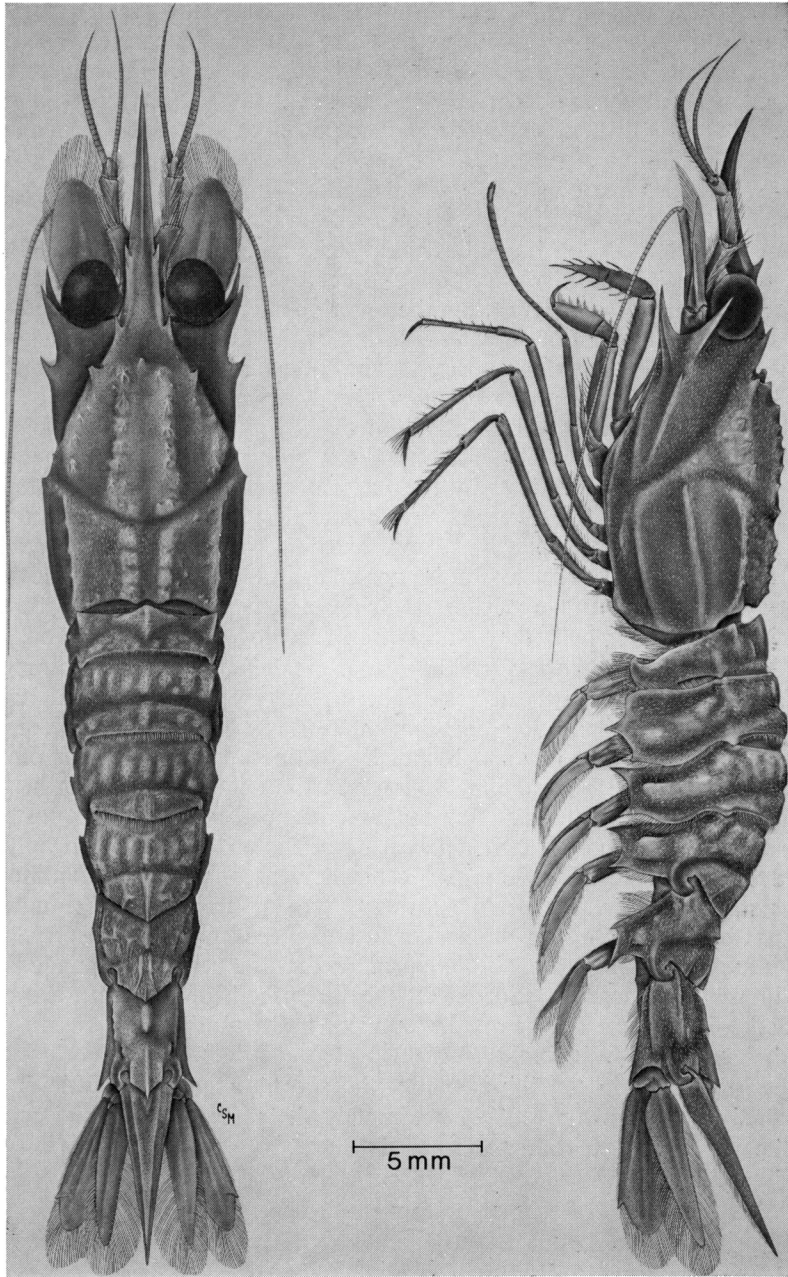
Glyphocrangon longirostris Bullis & Thompson, 1965, *Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510*: 8 (at least p.p.).

Material Examined.—E of South Carolina, U. S. A.: BLAKE sta. 315, 1 juvenile paralectotype of *Rhachocaris longirostris* Smith (USNM).—Bahama Islands: GERDA sta. 923, 1 ovigerous female.—Straits of Florida, U. S. A.: GERDA sta. 128, 2 males, 3 ovigerous females; sta. 365, 1 specimen; sta. 370, 1 female; sta. 374, 5 specimens (2 ovigerous); sta. 375, 1 male; sta. 449, 5 specimens (1 ovigerous); sta. 859, 1 ovigerous female; sta. 960, 3 specimens; sta. 963, 8 specimens; sta. 964, 3 specimens; sta. 965, 7 specimens; PILLSBURY sta. 634, 21 specimens (4 ovigerous).—NW of Cuba: BLAKE sta. 41, 1 ovigerous female (MCZ).—Gulf of Mexico off the Mississippi Delta: ALBATROSS sta. 2383, 1 specimen (USNM); sta. 2384, 4 specimens (1 ovigerous) (USNM); sta. 2385, 2 specimens (USNM); sta. 2392, 2 ovigerous females (USNM); OREGON sta. 1302, 1 specimen (USNM); sta. 1426, 3 specimens (1 ovigerous) (USNM).—S and SE of Jamaica: ALBATROSS sta. 2140, 2 juveniles (USNM); PILLSBURY sta. 1197, 34 specimens (10 ovigerous); sta. 1235, 21 specimens (6 ovigerous).—Gonave Bay, Haiti: PILLSBURY sta. 1178, 2 specimens (1 ovigerous).—Off St. Croix, Virgin Islands: BLAKE sta. 130, 1 specimen (MCZ); PILLSBURY sta. 1304, 3 specimens (2 ovigerous).—Off St. Kitts (= St. Christopher): ALBATROSS sta. 2751, 2 juveniles (USNM).—Off Guadeloupe: BLAKE sta. 162, 2 specimens (MCZ); sta. 174, 4 specimens (1 ovigerous) (MCZ).—Off Dominica: BLAKE sta. 176, 1 juvenile (MCZ); sta. 179, 1 specimen (MCZ); sta. 185, 2 juveniles (MP).—Off Martinique: BLAKE sta. 211, 1 juvenile (MCZ).—Off St. Lucia: BLAKE sta. 222, 2 juveniles (MCZ); PILLSBURY sta. 892, 25 specimens (11 ovigerous).—Off St. Vincent: BLAKE sta. 227, 1 specimen (MCZ).—Off Tobago: PILLSBURY sta. 844, 45 specimens (16 ovigerous); sta. 847, 5 ovigerous females.—Off Atlantic coast of Colombia: PILLSBURY sta. 770, 3 specimens (1 ovigerous).—Off Venezuela: PILLSBURY sta. 748, 168 specimens (38 ovigerous).—Off Surinam: PILLSBURY sta. 672, 8 specimens; sta. 673, 3 ovigerous females; sta. 675, 189 specimens (28 ovigerous); sta. 682, 6 specimens (1 ovigerous).

Description.—The body is covered with a short, dense pubescence, which leaves only the carinae and tubercles free. The tip of the rostrum is longer than the basal part, and about as long as the dorsal distance between the anterior and cervical grooves. The upper surface of the rostrum is smooth, and there is a median carina which extends from the top to somewhat beyond the anterior teeth. The upper surface of the basal part is not very concave; a curved carina connects each anterior with the corresponding posterior lateral tooth.

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FIGURE 14. *Glyphocrangon nobilis* A. Milne Edwards, ovigerous female from PILLSBURY sta. 844, in dorsal and lateral views.



The submedian ridges of the carapace bear wide, low, blunt tubercles, seven on the anterior, and four or five on the posterior carina. These tubercles usually are broken up into several smaller ones. The tubercles of the anterior intermediate carina are blunt and low, apart from the first, which ends in a distinct sharp tooth. The posterior intermediate carina has obscure indications of tubercles. There is no trace of the anterior antennal carina; the posterior one is straight and ends bluntly. The anterior lateral carina ends in a single, distinct, small tooth, which is placed at a level between the antennal and branchiostegal spines and rather far behind these. The posterior lateral ridge is smooth and curves strongly upward anteriorly; it lies on a much lower level than the anterior lateral carina, and almost in one line with the anterior sublateral carina, which is long and distinct. The posterior sublateral carina is short. The anterior submarginal is distinct and continues into the posterior submarginal, which is narrow and extends closely along the marginal carina until slightly beyond the posterolateral angle of the carapace. The lateromarginal groove is not in contact with the lateral, being blocked off by the fused posterior and anterior submarginal grooves, but it has a very narrow connection with the posteromarginal groove. The antennal spine is strong, reaching forward and slightly sideward; it is about parallel to the branchiostegal spine and about the same size. The upper surface of the branchiostegal spine bears two distinct carinae in its outer half; they stop before reaching the lateral carina.

The three teeth on the first abdominal somite are relatively short and low, the median being the lowest. There is a row of tubercles along the posterior margin, but not along the anterior one. The tubercles on the other somites are very low and blunt. No distinct median carina is present on the second and third somites; it starts in the middle of the fourth. The submedian ridges of the fifth somite are continued as far as the posterior margin of the somite. The median carina of the sixth somite is deeply incised in the basal half. Of the two central ridges on the lateral surface of the sixth abdominal somite, the lower is the longer; it is rather uneven, but not broken; the upper one is shorter and placed more posteriorly. The lower carina is also entire. The pleuron of the first somite is rounded, being bluntly produced anteriorly. Of the three teeth of the pleuron of the second somite, the anterior one is rounded, the two others are sharp. The third, fourth, and fifth somites have two pleural spines. The anterior spine is the larger one in the third somite, the shorter one in the fifth; in the fourth the two spines are of approximately the same length. The carinae of the telson are smooth.

The eye has a well-developed, black cornea. The stalk bears a spinule in the distal part of the inner margin.

The scaphocerite is ovate. In juveniles, it has a tooth in the lower half of the outer margin.

The second pereopods are slightly unequal. The right is somewhat longer, reaching with part of the carpus beyond the scaphocerite. The right carpus has 24 to 30 segments, and the left one has 20 to 24 segments. The third leg reaches to the end of the scaphocerite. Its dactylus is oval, ending in a single point; it is about $\frac{1}{3}$ of the length of the propodus, and shows a groove in the distal part of the upper surface. The dactylus of the fourth leg is about half as long as the propodus, or longer. It is oval, with a single point like that in the third leg, but it is more flattened, with the upper surface hollowed out.

The sternite of the fifth thoracic somite of the male shows a median tubercle.

Size.—The smallest specimen examined had a carapace length of 14 mm. The largest male had cl. 27 mm. Ovigerous females had cl. 25 to 34 mm. The eggs are 2.5×3 mm.

Colour.—The rostrum and the anterior part of the carapace (before the anterior groove and above the lateral carinae) are red; there may be a paler spot behind and above the antennal spine. Furthermore, the anterior parts of the intermediate and submedian carinae may be red. The posterior branchial region is pink or pale orange brown, or may be whitish, and a small, dark red spot may be present on the posterolateral margin. The rest of the carapace, including the submedian carinae, is not coloured.

The abdomen is uncoloured, except for a pink tinge on the first somite, and on the posterior parts of the second to fifth somites. The teeth of the first somite may be red, but as a whole the abdominal tergum is whitish or at least a very pale colour. The pleura are red entirely, or in their distal parts only. The telson is pink or pale orange, with darker carinae and a darker tip. The eyes of adult specimens have the cornea very dark, with a golden sheen; in the juveniles the eyes are pale, almost white. The antennulae, antennae, mouthparts, pereopods, and pleopods are dark red. The uropods may be pink or red, but are usually paler than the pleopods; however, sometimes the fifth pleopods also may be pink or red. Eggs are blue or yellow. The general impression is of a shrimp which is white dorsally, but deep red anteriorly and ventrally.

Commensals.—A specimen from PILLSBURY sta. 675 carried hydroids on the carapace.

Horizontal Distribution.—The species is known from South Carolina (U. S. A.) and the Bahama Islands south to Surinam, including the greater part of the West Indian area. The records in the literature are: East of South Carolina, U. S. A., $32^{\circ}18'20''N$, $78^{\circ}43'00''W$ (225 fm) (Smith, 1882); northwest of Cuba, $23^{\circ}42'N$, $83^{\circ}13'W$ (860 fm) (Faxon, 1896); off the Mississippi Delta, Gulf of Mexico, $28^{\circ}53'N$, $87^{\circ}58'W$ (890 fm) (Bullis &

Thompson, 1965); off Frederiksted, St. Croix, Virgin Islands, 17°43'N, 64°55'10"W (541 fm) (Faxon, 1896; Schmitt, 1935); off Guadeloupe, 16°02'40"N, 61°50'28"W (734 fm, 878 fm) (Faxon, 1896); off Dominica, 15°26'36"N, 61°36'45"W (1131 fm) (type-locality; A. Milne Edwards, 1881; A. Milne Edwards, 1883; Young, 1900); off Dominica, 15°32'18"N, 61°30'55"W (391 fm), 15°30'50"N, 61°32'55"W (824 fm; neotype locality), 15°24'55"N, 61°27'10"W (333 fm); off Martinique, 14°28'40"N, 61°06'08"W (357 fm); off St. Lucia, 13°58'37"N, 61°04'45"W (422 fm); off St. Vincent, 13°10'10"N, 61°18'15"W (572 fm) (Faxon, 1896).

Vertical Distribution.—The species has been reported from depths between 225 and 1181 fm (= 410 and 2150 m). Most specimens were found between 700 and 800 fm (= 1280 and 1460 m). In the shallower hauls (less than 500 fm) the far larger percentage of the specimens were juveniles. Ovigerous females were found in depths between 585 and 975 fm. The bottom of the stations at which the species was collected consisted of: gray ooze (BLAKE sta. 130), blue *Globigerina* ooze (ALBATROSS sta. 2751), sand and ooze (BLAKE stas. 222, 227), dark brown ooze and sand (BLAKE sta. 176), sand and brown ooze (BLAKE stas. 179, 182), mud (OREGON sta. 1426), gray mud (ALBATROSS sta. 2385; OREGON sta. 1302), brown and gray mud (ALBATROSS stas. 2384, 2392), brown and green mud (ALBATROSS sta. 2383), yellow clayey mud with much log debris (PILLSBURY sta. 1178), fine sand and mud (BLAKE sta. 185), sand (ALBATROSS sta. 2140), fine sand (BLAKE sta. 211), lava sand (BLAKE sta. 162), green sand, black specks, and broken shell (BLAKE sta. 315).

Type-Material.—The holotype of the present species (from BLAKE sta. 182, off Dominica, 15°26'36"N, 61°36'45"W, 1131 fm, sand and brown ooze, 26 January 1879) could not be located, either in the Museum of Comparative Zoology, Harvard University, Cambridge, Mass., or in the Museum d'Histoire Naturelle in Paris. It has to be considered lost. As the original description of the species by A. Milne Edwards is insufficient for a certain recognition, and the figure that he provided later (A. Milne Edwards, 1883) is rather poor, it seems best to select a neotype, in order to settle definitely the identity of the species. As such is now chosen a specimen with a carapace length of 21 mm from BLAKE sta. 179 (off Dominica, 15°30'50"N, 61°32'55"W, 824 fm, sand and brown ooze, 25 January 1879), preserved in the collection of the Museum of Comparative Zoology, Harvard University, Cambridge, Mass., under Reg. No. 4061. It is quite well possible that this specimen was examined by A. Milne Edwards at the time that he described the species.

Remarks.—The material of the present species collected by the BLAKE at its station 41, as well as that of *G. alispina* collected by the same expedi-

tion at sta. 130, and now preserved in the Museum of Comparative Zoology, carries a label with the manuscript name "Glyphocrangon Batei A. Milne Edwards." So far as I know this name has never been published by A. Milne Edwards or any other author, and can best be ignored.

The smaller of the two specimens assigned by Smith (1882) to *Rhachocaris longirostris* in his original description of that species, on examination proved to be *G. nobilis*. As the larger of the two syntypes served Smith practically exclusively for his description and figures, it is selected here to be the lectotype of *R. longirostris*. In this way the name *longirostris* can continue to be used in the generally accepted sense.

One of the two specimens from BLAKE sta. 130 brought by Faxon (1896) to the present species, upon examination in the Museum of Comparative Zoology proved to belong to *G. alispina*; the other specimen is a true *G. nobilis*. Faxon's material from BLAKE stas. 41, 162, 174, 176, 179, 221, and 222 could also be reexamined. It proved to be correctly identified; only the identity of the very young specimens could not be made out with full certainty.

Bullis & Thompson (1965) reported three lots of *Glyphocrangon* (viz., from OREGON stas. 1302, 1908, and 2010) to *G. longirostris*. The material from sta. 1302 could be examined and proved to be *G. nobilis*. As the material from the other two stations was not available, nothing definite can be said about its identity; in view of the small depth at which it was collected, its identity with *G. longirostris* does not seem likely.

Glyphocrangon alispina Chace, 1939

Fig. 15

Glyphocrangon nobilis Faxon, 1896, Bull. Mus. comp. Zool. Harv., 30: 159 (p.p.).—Schmitt, 1935, Sci. Surv. P. Rico, 15: 170 (p.p.), not fig. 33.

Glyphocrangon alispina Chace, 1939, Mems Soc. Cub. Hist. nat., 13: 39.—Bullis & Thompson, 1965, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 510: 8.

Glyphocrangon (*Glyphocrangon*) *alispina* Springer & Bullis, 1956, Spec. Scient. Rep. U. S. Fish Wildl. Serv., Fisheries, 196: 13.

Material Examined.—Straits of Florida, U. S. A.: GERDA sta. 112, 33 specimens (17 ovigerous); sta. 122, 106 specimens (13 ovigerous); sta. 125, 15 specimens (1 ovigerous); sta. 131, 143 specimens (5 ovigerous); sta. 136, 48 specimens; sta. 142, 1 male; sta. 144, 1 male; sta. 146, 3 males, 1 female; sta. 221, 9 specimens (1 ovigerous); sta. 289, 45 specimens (36 ovigerous); sta. 362, 3 males, 27 females (26 ovigerous); sta. 365, 1 male; sta. 366, 4 specimens (1 ovigerous); sta. 439, 23 ovigerous females; sta. 440, 10 females (9 ovigerous); sta. 442, 362 specimens (37 ovigerous); sta. 443, 7 specimens; sta. 475, 2 ovigerous females; sta. 860, 156 specimens (53 ovigerous); sta. 861, 2 ovigerous females; sta. 867, 2 specimens;

sta. 870, 2 males, 2 females, 1 juvenile; sta. 966, 8 ovigerous females; sta. 1101, 64 specimens (28 ovigerous); ATLANTIS sta. 2995, 1 ovigerous female holotype (MCZ).—Eastern Gulf of Mexico: ALBATROSS sta. 2394, 3 specimens (2 ovigerous) (USNM); sta. 2395, 4 specimens (1 ovigerous) (USNM).—Off Yucatan, Mexico: PILLSBURY sta. 605, 1 male, 1 ovigerous female; sta. 607, 3 specimens (1 ovigerous).—S of Jamaica: PILLSBURY sta. 1224, 26 specimens (15 ovigerous); sta. 1235, 1 specimen; sta. 1255, 1 specimen; sta. 1261, 1 specimen; sta. 1262, 1 specimen.—Off Frederiksted, Saint Croix, Virgin Islands: BLAKE sta. 130, 1 ovigerous female (MCZ).—Off Nevis: PILLSBURY sta. 954, 60 specimens (25 ovigerous).—Off Guadeloupe: PILLSBURY sta. 919, 1 male, 1 female; sta. 946, 21 specimens (10 ovigerous).—Off St. Vincent: PILLSBURY sta. 881, 1 male.—Off Tobago: PILLSBURY sta. 846, 6 specimens; sta. 847, 13 specimens (3 ovigerous).—Off Atlantic coast of Panama: PILLSBURY sta. 325, 2 specimens; sta. 337, 2 specimens; sta. 407, 41 specimens (19 ovigerous); sta. 447, 3 specimens (1 ovigerous); sta. 448, 12 specimens (4 ovigerous).—Off Atlantic coast of Colombia: PILLSBURY sta. 381, 14 specimens (8 ovigerous); sta. 388, 26 specimens (15 ovigerous); sta. 391, 6 specimens (3 ovigerous); sta. 413, 22 specimens (15 ovigerous).—Off British Guiana: PILLSBURY sta. 689, 4 females (2 ovigerous).

Description.—The species is very close to *Glyphocrangon nobilis* and can easily be confused with it. It differs in the following points:

The rostrum is shorter and less slender. In ovigerous females it reaches with less than $\frac{1}{4}$ to $\frac{1}{3}$ of its length beyond the scaphocerite (in *G. nobilis* with slightly less than $\frac{1}{2}$).

The tubercles on the submedian carinae are not broken up into smaller ones, are far narrower, and the anterior two tubercles of the anterior carinae end in distinct teeth. The anterior tubercle of the anterior intermediate carina is transformed to a distinct spine, about as sharp and as large as the basal rostral tooth. The posterior antennal carina ends in a distinct, sharp, anterior tooth; this is one of the most important features separating *G. alispina* from *G. nobilis*, in which this carina ends bluntly or rectangularly. The tooth of the anterior lateral carina is shorter than that of *G. nobilis*.

The antennal spine usually, but not always, is directed more sideways than the branchiostegal and overreaches it laterally.

The three teeth (especially the median) on the first somite of the abdomen in *G. alispina* are higher and sharper than in *G. nobilis*.

The central carinae on the lateral surface of the sixth somite are smooth and uninterrupted; they are straight and not irregular as in *G. nobilis*.

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FIGURE 15. *Glyphocrangon alispina* Chace, ovigerous female from GERDA sta. 1101, in dorsal and lateral views.